Pacific Seabird Group

BULLETIN

Volume 9 Number 2 Winter 1982

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PACIFIC SEABIRD GROUP
BULLETIN

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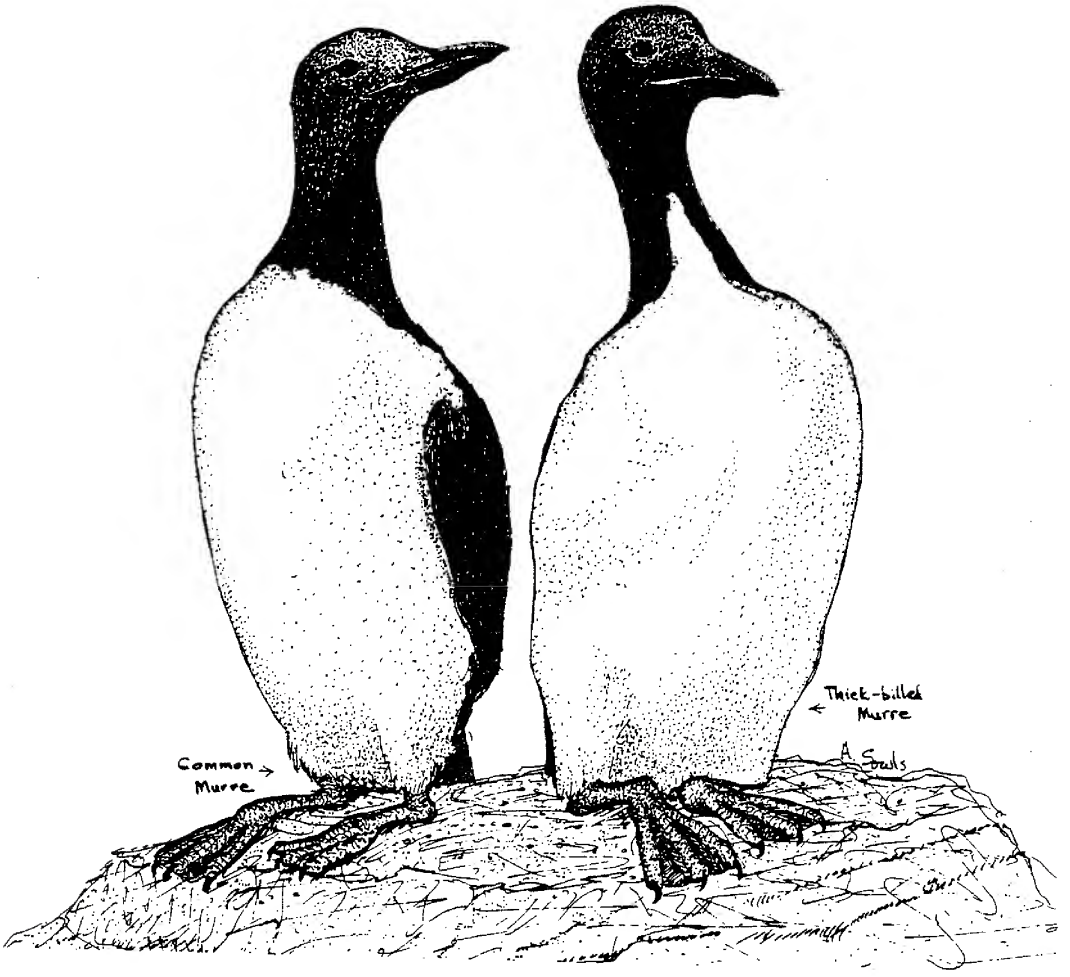

Thick-billed Murre
Common Murre
A. Seals

THE CHAIRMAN'S PAGE

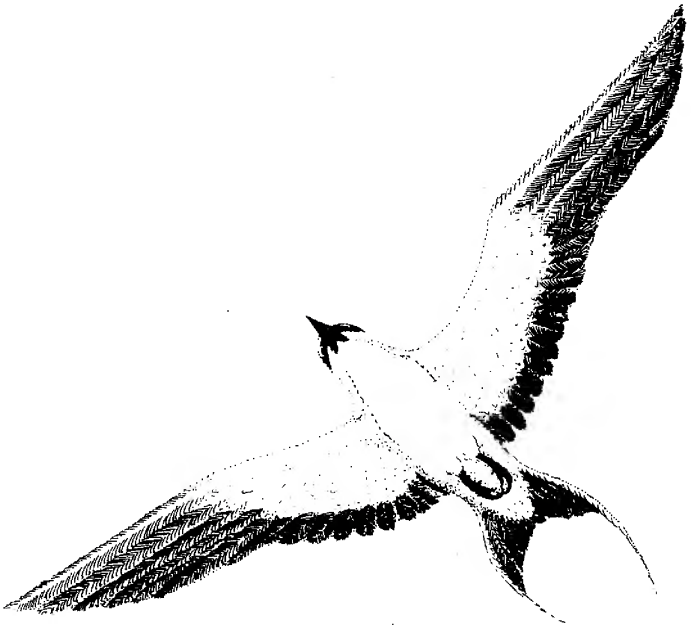
It has been my pleasure to have served as PSG Chairman for the past year. I have enjoyed the opportunity to work with many of you on a variety of activities.

The highlight of the past year, as usual, was our annual meeting. Craig Harrison, Stewart Fefer, Maura Naughton, and others who helped with arrangements for the meeting in Honolulu did an outstanding job. We had a good meeting, with a full program of papers presented on a wide array of topics. Meeting facilities were excellent, there were few logistics problems, and we had ample opportunity for those useful discussions that take place during breaks, etc.

Minutes of the Executive Council meeting contain reports of some of the more important activities of the past year and decisions that were reached at the meeting. I tried to list those that I considered most important, but found that I was including almost everything. My conclusion is that we had a productive Executive Council meeting focused on important business matters.

I wish Craig Harrison and other members of the new Executive Council great success in the coming year. I also thank PSG members for their support and interest in PSG activities during the past year.

Harry M. Ohlendorf
Davis, California
December 1982



PACIFIC SEABIRD GROUP NEWS

PSG Tenth Anniversary

The next annual meeting will mark the tenth anniversary of the PSG. Chairman-Elect Judith Hand would like suggestions for ways in which the anniversary might be celebrated. Please send her your ideas for special projects, symposium topics, and banquet speakers.

Deadline for Next Bulletin

The deadline for submitting copy for the next Bulletin is 15 May. It is especially important that the Regional Representatives prepare their reports before the beginning of the field season.

Proposed Minutes of the Pacific Seabird Group Executive Council Meeting, 1 December 1982

1. The ninth annual business meeting of the Executive Council of the Pacific Seabird Group was held on Wednesday, 1 December 1982, in the Diamond Head Room of the Hawaiian Regent Hotel, Honolulu, Hawaii. Chairman Ohlendorf called the meeting to order at 0900 hours.

2. Chairman Ohlendorf verified that a quorum was present and introduced the officers and representatives.

3. Secretary Hand read the proposed minutes of the 1982 EC meeting (PSG Bull. 8:76-81). The *MINUTES* were *APPROVED* as read.

4. Treasurer B. A. Schreiber was absent. R. Schreiber presented the treasurer's report: the balance as of 31 October was $7,946.59.

5. Chairman Ohlendorf reported results of the last election:

Chairman:	C. Harrison
Chairman-elect:	J. Hand
Secretary:	S. Quinlan
Treasurer:	D. Siegel-Causey
Alaska:	T. DeGange
Hawaii:	S. Fefer
Mexico:	E. Velarde
N. California:	B. Boekelheide
Washington:	D. Boersma

Chairman's Report

6. *Bullitt Foundation Donation.* The PSG received a contribution of $1,000.00 from the Bullitt Foundation (Seattle) for the publication of the Seattle symposium. Since publication is being funded from other sources, Chairman Ohlendorf wrote the foundation, acknowledging receipt of the donation and stating that it would be used to benefit PSG's efforts "in obtaining better scientific information on marine bird populations and in ensuring their preservation."

7. *Seattle Symposium.* Chairman Ohlendorf reported that, according to D. Nettleship, the proceedings from the Seattle symposium are to be published by 31 March 1983.

8. *Proposed Marine Sanctuaries.* Chairman Ohlendorf described his responses to a request from the Chelsea Corporation, Washington, D.C., for comments from the PSG on proposed marine sanctuaries in Alaska, Washington, Oregon, California, and Hawaii. All PSG regional representatives were sent copies for review and comment, and several—particularly C. Harrison in Hawaii—supplied comments that were passed to the Chelsea Corp.

9. *PSG Name Change* (see PSG Bull. 8:71-72). Because the original survey of the membership concerning their wishes in this matter was inconclusive, Chairman Ohlendorf appointed a committee headed by J. Strauch to consider a) the proposed name change and "areas of PSG interest" and how these are related and b) possible changes in the regional representative system. This committee is now having a second round of correspondence. Since most committee members were not present in Hawaii, there was no discussion and a report from the committee is pending. Chairman Ohlendorf encouraged anyone having further comments to send them to Editor Strauch.

New Business or Discussion

10. *Dues Notices.* C. Harrison opened a discussion on whether dues notices should be sent as an inclusion in the bulletin or as a separate mailing. There was general agreement that there should be a separate mailing.

11. *PSG Nominations.* Chairman Ohlendorf led a discussion of how nominations for PSG EC positions should be made, questioning particularly whether the nominating committee (composed of regional representatives and the editor of the Bulletin) is solely responsible for suggesting nominees or whether the membership at large is supposed to make nominations and whether it is appropriate for current regional representatives to nominate themselves. L. Leschner and J. Hand explained how this has been done in the past: the membership being asked for suggestions but the nominating committee (especially the committee chairman) being responsible for the final slate. There was general agreement that this has worked well in the past and that no changes are needed. Three suggestions were made from the group: a) that a person who suggests someone (or himself or herself) for nomination submit a statement from the person in writing that he or she is willing to serve if nominated and elected, b) that it be made clear in any general announcement soliciting suggestions for nominees that the final decision on the slate rests with the nominating committee, and c) that during the annual meeting the nominating committee meet to make a list of and contact potential nominees. Chairman Ohlendorf asked incoming Chairman Harrison to draw up a list of nominating procedures to be used as a guideline by nominating committees. He also designated S. Fefer Chairman of the Nominating Committee.

12. *ICBP Membership.* Chairman Ohlendorf read a letter from Warren King (Chairman, U.S. Section of ICBP) inviting PSG to apply for membership in ICBP (annual dues are $100.00). R. Schreiber *MOVED* that PSG become a member of ICBP, U.S. Section. The *MOTION* was *PASSED.*

13. *PSG Bulletin.*

    a. Chairman Ohlendorf reported that the problem of late receipt of Bulletins mailed to non-continental U.S. and foreign members appears to be resolved as well as prevailing postal service allows.

b. Loose inserts have been lost from some Bulletins in the mail. Suggestions to prevent loss were discussed. G. Hunt stated that some notices were important enough to merit the costs of separate mailing and that receiving mailings in addition to the Bulletin encourages members to participate more and to feel they are getting more from the organization. Chairman Ohlendorf suggested that incoming Chairman Harrison talk with P. Springer about ways to prevent losses. There seemed to be agreement that the costs of two regular annual mailings in addition to the Bulletin were merited: those for the meeting notice/call for papers and ballots.

c. In a letter read by Chairman Ohlendorf, Bulletin Editor Strauch requested guidance about producing the Bulletin: its format (type size, page size, etc.) and costs for various options. R. Schreiber *MOVED* that PSG underwrite costs to have right-hand justification done. The *MOTION* was *PASSED*. The EC also recommended that page size remain the same but the editor should be free to experiment with options (type sizes) that might bring costs down.

d. Chairman Ohlendorf opened discussion of whether PSG should exchange journals with other seabird societies and, if so, the mechanism for doing so. R. Schreiber then reviewed problems with having PRBO as our permanent address and also discussed housing and distributing back issues of the Bulletin, which has been done by the Los Angeles County Museum of Natural History at their cost for several years. He suggested that all three functions be performed by one institution and stated that the L. A. Co. Museum was willing to assume this responsibility. After discussion, J. Hand *MOVED* that we use L. A. Co. Museum a) for storage and mailing of back issues and b) as the site for housing and exchanging journals with other societies. The PRBO is to remain the permanent address. The *MOTION* was *PASSED*.

14. *Expressions of Appreciation*. R. Schreiber *MOVED* that the EC thank Paul F. Springer for the many contributions he has made toward the proofing, printing, and mailing of the Bulletin. The *MOTION* was *PASSED*. C. Harrison *MOVED* that the EC thank outgoing Treasurer Betty Anne Schreiber for the many years she has conscientiously kept the Group's financial and membership records and for her help in guiding the financial management of the organization. The *MOTION* was *PASSED*.

15. *Costs of Travel for Speakers or EC Members*. There was general agreement that costs of travel to meetings for PSG officers should not be supplied from general funds. Considerable discussion about providing travel funds for invited speakers included the following: a) if we have invited speakers for a symposium, we should include travel costs in the application for a grant for organizing the symposium; b) we should offer "excellent" speakers one-half round trip economy costs (M. Scott); c) we should not use PSG membership dues to pay other ornithologists to come, even as an invited speaker (R. Schreiber); d) or, in contrast, it may be a good use of dues to have quality speakers come on occasion, and that researchers in some countries could not otherwise attend because they cannot use hard currency for travel (G. Hunt); and e) PSG might consider establishing an endowment fund that would provide partial costs of travel for some speakers and some funding for publication of symposia (J. Hand). C. Harrison *MOVED* that PSG expend no dues funds for speakers except in exceptional circumstances. The *MOTION* was *PASSED*. Chairman Ohlendorf recommended that the incoming EC look into ways to fund travel and publication costs.

16. *Coordination of Local Committee.* Chairman Ohlendorf reviewed the duties of the local committee coordinator, suggesting that the list be expanded to cover such things as familiarity with audiovisual equipment and notice be given that detailed financial records are to be sent to the treasurer. Chairman Ohlendorf asked L. Leschner and S. Fefer to suggest suitable modifications of guidelines obtained from two other societies for use by the PSG organizers.

17. *Student Registration Fee.* S. Fefer asked if students should have a slightly lower registration fee. G. Hunt stated that the fee is not the major cost and that the local committee should attempt to find low-cost "camping" facilities for students, perhaps asking local people to provide a floor in their homes for sleeping bags when no other camping facilities are available.

18. *Standing Committees.* Chairman Ohlendorf abolished the Coastal Surveys, Human Disturbance, and Publications committees after receiving no objections.

    a. Translations Committee—Ohlendorf read an updated report from Chairman D. Siegel-Causey. There was strong agreement that this committee was worthwhile and should be continued. The committee's report is to be published in the Bulletin.

    b. Seabirds and Fisheries Committee—After presenting a brief report, Chairman Hunt questioned whether PSG should lump this committee into a broad conservation committee. There was general agreement that we should keep a separate and well-focused fisheries committee.

    c. A New Conservation Committee—Chairman Ohlendorf stated that he was establishing a new Conservation Committee that would also embrace the old Seabird Sanctuaries Committee which was abolished following discussion. M. Scott said the PSG's various types of conservation committees have lacked focus. Hand suggested that, among its other duties, the Conservation Committee be charged with selecting one special conservation issue annually to be aired in the Bulletin, that comments and views on this issue be solicited from the PSG membership and other parties to the problem in question (including the major opposing views), and that these viewpoints be presented in a subsequent bulletin with a PSG resolution on the issue to appear in a third bulletin. Chairman Ohlendorf stated that he has appointed K. Vermeer as Chairman of this committee and the committee's tasks will be to identify conservation issues and to work with the Chairman to draft policy statements for consideration by the EC.

    d. Chairman Ohlendorf suggested that chairmen of all standing committees be required to prepare a brief annual written report for the EC, to be published in the Bulletin. Hunt proposed that committees also have an open meeting at an announced time during the annual meeting to air most important issues. Chairman Ohlendorf directed that the Program Chairman include time for such open meeting in the official program.

19. *Membership Dues.* R. Schreiber reported that there was some loss of membership when dues were raised but that the financial loss this represented was compensated for by the increase in dues. The EC decided to leave the dues at $10.00.

20. *Proceedings of the Tropical Seabird Symposium*. R. Schreiber reported that members who attended the meeting will not receive the proceedings free, but all PSG members will get a $5.00 discount from the retail price.

21. *Recruiting*. C. Harrison suggested that we use the mailing list of the Ornithological Societies of North America to identify individuals who might wish to join PSG, especially in foreign countries. J. Strauch (in a letter) suggested using a reduced fee to encourage Central and South American memberships. Chairman Ohlendorf directed incoming Chairman Harrison and the EC to explore ways of contacting possible new members.

22. The membership was adjourned for lunch at 1245 and reconvened by Chairman Ohlendorf at 1945 at the same location.

23. *Resolutions*. Three resolutions submitted by letter from Alaska Regional Representative M. Petersen were discussed: A. removal of introduced Arctic Foxes from selected seabird nesting islands in Alaska using a biological agent; B. removal of introduced Arctic Foxes from selected islands in the Aleutian Islands using Compound 1080 or an anticoagulant; C. consideration of Marbled Murrelets in old-growth forest management. After extensive discussion of resolutions A and B, particularly the appropriateness of any advocacy by the PSG of Compound 1080, Chairman Ohlendorf assigned incoming Chairman Harrison to write a much shorter, tightly worded proposal, along the lines detailed during the group's discussion, to be sent to J. Trapp and then to be distributed by the Alaska Representative to the appropriate agencies. J. Hand *MOVED* that the shortened and reworded draft concerning methods for removal of Arctic Foxes be accepted. L. Leschner *MOVED* that a slightly modified resolution on Marbled Murrelets be accepted. Both *MOTIONS* were *PASSED*. The resolutions read as follows:

RESOLUTION 1: INTRODUCED PREDATORS ON SEABIRD NESTING ISLANDS

WHEREAS, the Pacific Seabird Group recognizes the adverse impacts of introduced predators on nesting seabird populations; and

WHEREAS, on Aleutian Island and Pacific Island National Wildlife Refuges chemical and other control techniques may be feasible with minimal or no adverse impacts to nontarget species;

THEREFORE, BE IT RESOLVED that the Pacific Seabird Group recommends that the U.S. Fish and Wildlife Service take immediate action to remove introduced predators from seabird nesting islands under FWS jurisdiction (such as those on Alaskan and other Pacific Islands) through whatever means are feasible including the use of biological and chemical control agents.

RESOLUTION 2: CONSIDERATION OF MARBLED MURRELETS IN OLD-GROWTH FOREST MANAGEMENT

WHEREAS, the Marbled Murrelet is a seabird native to the North Pacific Ocean, having breeding populations in both the United States and Canada; and

WHEREAS, the distribution and abundance of breeding Marbled Murrelets appear to be closely related to the remaining stands of old-growth forest along the Pacific Coast of North America from California to Alaska; and

WHEREAS, available evidence indicates that a significant proportion of the North American population of Marbled Murrelets is dependent upon extensive stands of old-growth forest for nesting; and

WHEREAS, most remaining old-growth forests are scheduled to be logged in the next 50 years; and

WHEREAS, the International Council for Bird Preservation's Alcid Working Group has recognized the Marbled Murrelet as a species of concern because of habitat destruction within its breeding range; and

WHEREAS, the U.S. Forest Service is responsible for managing most of the remaining old-growth forest stands in the United States;

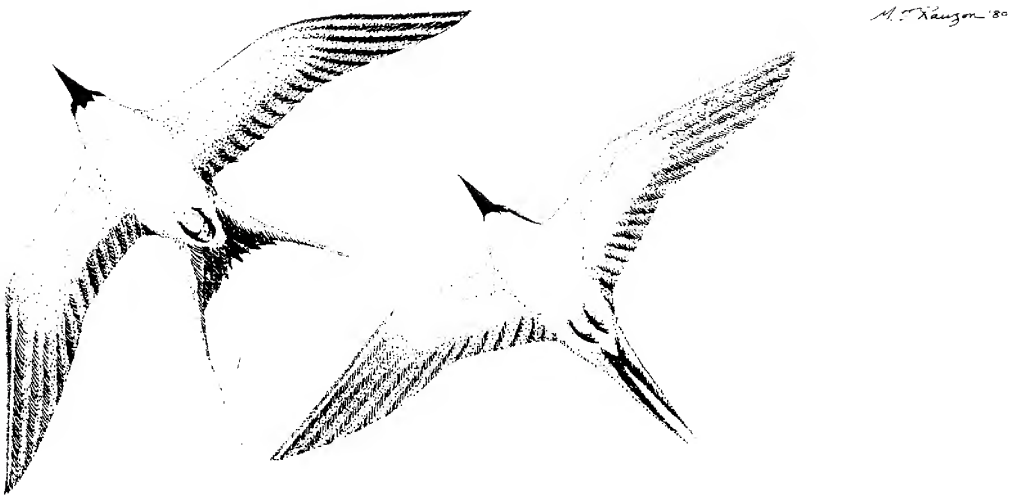
THEREFORE, BE IT RESOLVED that the Pacific Seabird Group recommends that U.S. and Canadian forest and wildlife management agencies consider Marbled Murrelets in all management plans and other proposed developments that may adversely affect the integrity of the old-growth forest; and

BE IT FURTHER RESOLVED that the Pacific Seabird Group respectfully request that U.S. and Canadian forest and wildlife management agencies fund studies to investigate the habitat requirements of nesting Marbled Murrelets.

C. Harrison suggested that copies of these and all future resolutions be sent to the ICBP, U.S. Section.

24. *Future Meeting Sites*. Since the EC had not found a member to act as Local Committee Chairman for the meeting in Asilomar in January 1984, C. Harrison *MOVED* that the PSG meet in Vancouver in January 1984 with G. Kaiser as Local Chairman unless a local committee chairman for Asilomar was found before the opening of the business meeting on Friday. The *MOTION* was *PASSED*. (Secretary's note: R. Mewaldt subsequently volunteered to serve as Local Chairman; consequently, the 1984 meeting will be held in Asilomar 3-8 January as planned). C. Harrison *MOVED* that the January 1985 meeting be held in Long Beach, hosted by Long Beach State University, with C. Collins and S. Warter as Local Chairmen. The *MOTION* was *PASSED*. Collins is to verify that L. B. State can handle the meeting and so inform incoming Chairman by early February 1983.

Respectfully submitted,
Judith Latta Hand, Secretary



THE PROGRAM CHAIRMAN'S COMMENTS
PACIFIC SEABIRD GROUP - AUSTRALASIAN SEABIRD GROUP MEETING
Honolulu, Hawaii
1-4 December 1982
Craig S. Harrison

The Ninth Annual PSG Meeting, held with the Australasian Seabird Group, was the first joint meeting between any of the world's five seabird groups. About 100 biologists from 8 countries attended the meeting. The two symposium sessions, (1) Ecology of Tropical Seabirds and (2) Human Disturbance and the Effects of Predation on Seabirds, were a success and served to focus this meeting. Forty-four papers were presented. Many of the papers presented in the Tropical symposium (and several by authors who were unable to attend) will be published in the Cooper Ornithological Society's *Studies in Avian Biology* series during 1983. Ralph Schreiber is editor. PSG members will be able to purchase this volume at a reduced rate.

Thanks to all of the participants for making the meeting a rewarding experience, especially those who travelled great distances to attend. I hope that ties have been strengthened between biologists in the North and South Pacific and that this meeting has marked a step toward greater international cooperation in the study and conservation of seabirds.

The Midway trip was cancelled by the Navy with two days' notice after many had filled out the long and tedious security clearance forms and several had come to Honolulu specifically for the trip. I apologize to those who were disappointed by the sudden declaration of a national security interest on Midway. The best-laid plans....

Stewart Fefer and Maura Naughton devoted much time and energy toward making arrangements for the meeting. The Hawaiian Regent Hotel was an excellent facility for our meeting, and its staff was extremely cooperative in attending to our sundry needs, often on a moment's notice. I hope that future local chairmen will consider a hotel site for a meeting. J. B. Nelson gave an interesting and provocative banquet address. Thanks to the U.S. Fish and Wildlife Service for making many of its personnel available to plan and coordinate this meeting.

Aloha.

ABSTRACTS

OLFACTORY NEUROANATOMY OF THE SOOTY SHEARWATER AND NORTHERN FULMAR

Fox, V. Susan, Henry Davidian, Larry V. Hutchison, and Bernice M. Wenzel, Department of Physiology, UCLA School of Medicine, Los Angeles, CA 90024

The Sooty Shearwater and Northern Fulmar are known to have 1) nasal adaptations that promote extensive olfactory mucosae, 2) very large olfactory bulbs, and 3) sensitivity to odors in foraging. Nothing is known, however, about their central neural olfactory tissue, nor have quantitative comparisons been made with the one species whose brain has been analyzed, the Rock Dove. Gross and microscopic examination of normal specimens have been carried out for all three species. In proportion to bulb size, the diameter of the olfactory nerve in the Sooty Shearwater and Northern Fulmar is about double that of the Rock Dove. Their olfactory bulbs are morphologically similar to that of the Rock Dove, as well as to those of mammals, in that the same cellular layers are present. There are cytoarchitectonic differences, however, such as greater mitral cell density in the Sooty Shearwater and Northern Fulmar. The descriptive comparative olfactory anatomy of these three species will be discussed in terms of functional implications.

PATTERNS OF YOLK GROWTH IN SEABIRDS

Grau, C. R., and L. B. Astheimer, Department of Avian Sciences, University of California, Davis, CA 95616

We examined 118 eggs of 24 species of seabirds in an attempt to determine similarities in the patterns of yolk deposition among related taxa. Estimates of the daily mass of yolk deposited on a growing ovum were calculated from measurements of yolk ring radii, assuming spherical yolks. We found that yolk deposition curves (cumulative mass vs. time) vary widely in seabirds, even within families, but some generalities can be made. Yolk deposition of a species appears to have a typical and constant pattern. Of the groups observed, alcids have the most rapid yolk growth while Procellariiformes (except some albatrosses) are the slowest; a Tufted Puffin forms a 28 g yolk in 10 days while a Grey-faced Petrel requires 23 days to produce a yolk of similar mass. Most growth curves approximate exponential or parabolic functions, but a few (esp. those of *Phalacrocorax* spp.) are linear. Other examples of yolk mass and formation times are: Sooty Tern (12 g, 9 days); White Tern (5.5, 9); Red-billed Gull (7, 14); Cassin's Auklet (6, 9); Adelie Penguin (22, 16); White-flippered Penguin (13, 13); Laysan Albatross (78, 25); Buller's Shearwater (18, 18); Wedge-tailed Shearwater (16, 18); diving petrel (6, 12); Fairy Prion (8, 18); Spotted Shag (4.6, 12); Pelagic Cormorant (4.5, 12).

COMPARISON OF SURVEY TECHNIQUES FOR BURROW-NESTING SEABIRDS

Savard, J.-P. L., and G. E. J. Smith, Canadian Wildlife Service, P. O. Box 340, Delta, BC V4K 3Y3, Canada

The accuracy and efficiency of four survey methods (quadrats, transects, point-centered quarter and Batchelor's) were compared in a Rhinoceros Auklet (*Cerorhinca monocerata*) colony. Transects of 1 x 50 m averaged 61 min for completion and the point-centered quarter method averaged 5 min per point. Rectangular plots and transects oriented perpendicular to the shore yielded more precise estimates than parallel transects. Systematic sampling tended to be more

precise than random sampling. The point-centered quarter method tended to overestimate burrow density whereas the Batchelor's method slightly underestimated it. Quadrats and transects closely approximated a complete count. Small quadrats (2 x 2 m) were more effective per area sampled than larger ones.

REPRODUCTIVE SUCCESS OF BLACK-LEGGED KITTIWAKES IN NORTHERN ALASKA

Murphy, Edward C., David G. Roseneau, and Alan M. Springer. Institute of Arctic Biology, University of Alaska, Fairbanks, AK 99701; LGL Alaska, P. O. Box 80607, Fairbanks, AK 99701; Institue of Marine Science, University of Alaska, Fairbanks, AK 99701

Black-legged Kittiwakes (*Rissa tridactyla*) experienced reproductive failure over a large region of the northern Bering Sea and eastern Chukchi Sea in 1976. Reproductive success improved markedly between 1977 and 1979 and then declined slightly in 1980 and 1981. The changes in reproductive success accompanied climatic changes in northern Alaska; 1975 and 1976 were exceptionally cold years but were followed by a warming trend between 1976 and 1979. Corresponding increases in prey availability after low levels in 1976 suggest a direct association between climatic conditions, seasonal development of the prey base, and kittiwake reproductive success.

In 1982 kittiwakes in the southern Bering Sea failed reproductively. Those in the northern Bering Sea and eastern Chukchi Sea had low and high success, respectively. These differences mirror the annual variation of previous years—fish prey were not abundant in kittiwake diets and water temperatures were cold in the southern Bering Sea, but environmental conditions and prey availability were more favorable to the north.

STATUS OF THE WORLD'S PELICANS (PELECANIDAE)

Schreiber, Ralph W. Natural History Museum, 900 Exposition Blvd., Los Angeles, CA 90007

I discuss the past and present distribution and status of the populations of the seven species of pelicans of the world. Available data indicate that populations of *Pelecanus rufescens* in Africa, *P. conspicillatus* in Australia, and *P. erythrorhynchos* in North America remain stable, although local population fluctuations do occur. *P. onocrotalus* shows a stable population in Africa but a decline in Asia and Europe, both in number of breeding birds and in number of colonies. *P. occidentalis* has apparently recovered from the DDT problems of the late 1960's-early 1970's. Only very small populations exist for *P. crispus* (Dalmatian) and *P. philippensis* (Spotted-billed). Fewer than 1000 pairs of *crispus* are known to be nesting in fewer than 20 colonies in eastern Europe and the USSR. Fewer than 500 pairs of *philippensis* are known to be nesting in 3 colonies in India and 1000 pairs in 23 colonies in Sri Lanka. Drastic population declines have occurred to both species in the past 2-3 decades. The causes are unknown. Unless these two species receive immediate, concerted efforts at preservation, they shall soon be extinct. Details on all species will be presented.

PRELIMINARY RESULTS FROM A LONG-TERM STUDY OF THE WESTLAND BLACK PETREL

Bartle, J. A. National Museum, Private Bag, Wellington, New Zealand

The Westland Black Petrel (*Procellaria westlandica*) breeds only on the mainland of the South Island, New Zealand, near Punakaiki. A long-term study of its breeding behavior, population ecology, and sea distribution started in 1969. Results show that adults of this large, strong burrowing petrel can withstand potential predators and the population has been increasing, since at

least 1953, at an average rate of about 5% per annum. The development of a major trawl fishery off the West Coast between 1966 and 1977 probably played a part in this increase. Scavenging from trawlers is a "learned" behavior, and most birds acquired this habit between 1958 and 1968 off the east coast of New Zealand. The winter breeding season is very long, with incubation extending over an average of 64 days, and development of chicks taking 120-130 days, and sometimes longer. Adult pairs do not breed every year. There is good agreement, between seasons, of average breeding success and the weight of males, but not females, in the pre-laying period. Thus breeding success may reflect the ability of males to secure and defend the burrow, and this will depend upon the male's condition.

SOOTY SHEARWATER POPULATIONS OFF CALIFORNIA: ABUNDANCE AND HABITAT USE

Chu, Ellen W., and Kenneth T. Briggs. Center for Coastal Marine Studies, University of California, Santa Cruz, CA 95064

Sooty Shearwaters nest in South America and the southwest Pacific and migrate annually to the northeast Pacific during the austral winter. They are very abundant off California, but the study of their populations is just beginning. We censused Sooty Shearwaters from ships and airplanes off California during 1975-1982, and determined which features of the environment best correlated with variations in density. Populations were largest in southern California in May and June and were largest north of Point Conception in May through July. Densities were highest in cool, shallow water within 50 km of the coast. Statewide populations were estimated to range from less than 12,000 to 2.9 million; the turnover rate of migrants and proportion of the population that remains off California during summer are unknown. In contrast to previously published reports, we found that populations declined in August and September, and we saw no evidence of concerted southbound migration, even over the central California Current.

Our observations suggest that both arrival and departure of Sooty Shearwaters off California occur across a broad front. Populations appear to move northward during summer in response to availability of suitable prey.

VOCALIZATIONS OF *Procellaria* PETRELS

John Warham, Zoology Department, University of Canterbury, Christchurch 1, New Zealand

Using spectrographs, a preliminary account is given of the vocalizations of the four members of the genus *Procellaria*: *P. cinerea*, the Grey Petrel; *P. aequinoctialis*, the Shoemaker; *P. westlandica*, the Westland Petrel; and *P. parkinsoni*, Parkinson's Petrel.

THE STRUCTURE OF PELAGIC SEABIRD COMMUNITIES: LATITUDINAL TRENDS

Ainley, David G. Point Reyes Bird Observatory, Stinson Beach, CA 94970

Four cruises were made in the South Pacific Ocean from the tropics to the Antarctic during the years 1976-1980. Birds were censused for one half hour out of every hour that the ships transited during daylight. Based on species associations and sea surface temperature and salinity profiles, seabirds were divisible into several "communities". The most clearly defined community occurred in the Antarctic (SST $<$ c. 3.0°C) and the least clearly defined community occurred in the tropics (SST $>$ c. 22.0°C). Except in the Antarctic, species composition changed regularly with regular changes in sea surface temperature. The following characteristics differed among communities:

species diversity, biomass, the tendency to form mixed-species foraging flocks, the use of feeding behaviors, and the use of wind as an energy source. In all communities, birds were concentrated predictably where sea surface T/S changed rapidly in association with subsurface topographic features. Thus even in the tropics, the predictability of productive foraging opportunities may be much more a function of time rather than location.

SEABIRD PREDATION ON *Halobates* AND THE TRANSFER OF Cd FROM SEA-SKATERS TO THEIR PREDATORS

Cheng, Lanna, Craig S. Harrison, and Meinhard Schulz-Baldes. Scripps Institution of Oceanography, University of California, La Jolla, CA 92093; U. S. Fish and Wildlife Service, P. O. Box 50167, Honolulu, HI 96850; Institut für Meeresforschung, Bremerhaven, FRG

Regurgitated food samples were collected from 18 seabird species on the Northwestern Hawaiian Islands between 1978 and 1980. *Halobates* was found in the diets of nine species but can be considered an important food item for only four species: Blue-gray Noddy, Gray-backed Tern, Bonin Petrel, and Bulwer's Petrel. The Blue-gray Noddy is the most important predator of *Halobates* and may at times feed exclusively on this food item. Since sea-skaters have been found to contain rather high concentrations of Cd (up to 200 ppm dry wt), they may supply appreciable quantities of this heavy metal to seabirds that eat them. *Halobates* collected from bird diet samples have been analyzed for Cd. The possible transfer of metals from sea-skaters to their avian predators will be discussed.

PHYSIOLOGICAL ECOLOGY OF INCUBATION IN TROPICAL SEABIRDS

Whittow, G. C. Department of Physiology, John A. Burns School of Medicine, University of Hawaii, Honolulu, HI 96822

During incubation the tropical seabird's egg loses water vapor and carbon dioxide to its environment, it takes up oxygen from its surroundings, and it acquires heat from the incubating adult bird. The regulation of these exchanges of materials and energy is discussed, with special reference to differences between tropical seabirds and species breeding in higher latitudes. In general, the rate of gas transfer between the eggs of tropical seabirds and their microclimate is reduced below that of nontropical seabirds. Some of the differences between the incubation physiology of tropical and other seabirds are related to the prolonged incubation of many tropical seabird eggs.

EMBRYONIC RESPIRATION AND GROWTH IN TWO SPECIES OF NODDIES

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Embryonic oxygen consumption, gas transfer and growth were measured during natural incubation in the Black (*Anous minutus*) and Brown Noddy (*A. stolidus*). The mean pre-external pipping oxygen consumption ($\dot{M}O_2$) among Black Noddy eggs was 184 ml O_2 STPD/day and occurred at a mean embryonic mass of 10.95 g on day 28 of the 35-day incubation period. Pre-external pip air cell gases in Black Noddy eggs were 98.5 torr for O_2 (PAO_2) and 42.3 torr for CO_2 ($PACO_2$). Hatchling Black Noddies (mean weight 16.80 g) consumed 524 ml O_2 STPD/day. Pre-external pip $\dot{M}O_2$ in Brown Noddy eggs averaged 283 ml O_2 STPD/day at a mean embryonic mass of 17.63 g on day 30-31 of the 36-day incubation period. Pre-external pip PAO_2 was 92.1 torr

and P_{ACO_2} was 46.6 torr. Hatchling Brown Noddies (mean weight 28.52 g) consumed 690 ml O_2 STPD/day. The adaptive features of embryonic respiration and growth exhibited by Black and Brown Noddies are characteristic of other seabird eggs with prolonged incubation. A low rate of pre-external pipping $\dot{M}O_2$, a long pip-to-hatch interval, a high oxygen cost of hatching, and a high cost of embryonic development are common features in the two species.

TEMPERATURE REGULATION OF GREAT FRIGATEBIRDS ON MIDWAY ISLAND

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Great Frigatebirds face severe potential heat stress during their nesting cycle because they are large, have black plumage, nest in tropical areas completely exposed to solar radiation, and remain on nests for up to 7 days. During May 1981 air temperature on Midway Island ranged from 18.7 to 30°C and operative temperature ranged from 14.2 to 44.5°C. During this time the body temperatures of 5 nesting Great Frigatebirds, measured by radiotelemeters for up to 4 days while the birds remained on nests, ranged from 37.1 to 41.4°C. Frigatebirds respond to heat stress with several adjustments in posture. The percentage of birds exhibiting these postures correlated with air and operative temperature in most cases. However, males correlated better with air temperature, while females correlated better with operative temperature. Some possible physiological and ecological reasons for this will be discussed.

SEASONAL UPWELLING AND SEABIRD ABUNDANCE OFF THE PACIFIC COAST OF PANAMA

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The numbers and distribution of marine birds, other colonial waterbirds, and some additional fish- and crab-eating birds were studied on most of the islands off the Pacific coast of Panama during dry season and again in wet season of 1982. All large birds seen as we circumnavigated more than 80 islands in a small boat were identified and counted. About half of the islands are in the Bay of Panama, where offshore trade winds cause an upwelling in dry season; increased productivity is associated with the upwelling. Seawater temperatures in the Gulf of Chiriqui, where the remaining islands are located, remain almost constant year-round. The results of the survey were consistent with the hypothesis that marine bird distribution and abundance off the Pacific coast of Panama are strongly influenced by increased productivity in the marine ecosystem of the Bay of Panama which is associated with a seasonal wind-driven upwelling. Brown Pelicans nest only in the Bay of Panama during dry season, in 7 colonies containing a total of more than 70,000 adults. Olivaceous Cormorants, as well, nest only in the Bay of Panama in the season of upwelling; colonies include at least 150,000 adults. Brown Boobies nest throughout the year, but Blue-footed Boobies apparently nest only in wet season. Although there is no apparent relation between timing of nesting by boobies and the seasonal upwelling, numbers of boobies are much greater year-round in the Bay of Panama than in the Gulf of Chiriqui.

NUMBERS OF BROWN PELICANS IN THE PEARL ISLAND ARCHIPELAGO, BAY OF PANAMA, IN 1981

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The Pearl Island Archipelago lies in the Bay of Panama about 40 km from Panama City, at 8° N, and 78° W, and consists of some 27 islands larger than 0.1 km^2. Five times during the dry season and early wet season of 1981, we counted all pelicans we saw from a small boat in which we circumnavigated the islands; more than 90 percent of the coastline in the Archipelago was surveyed. Peak numbers of about 25,500 pelicans were counted in April, after most eggs had hatched but before young of the year began leaving the nests. Pelicans began arriving to nest in early January, and most adults and young had left the Archipelago and the Bay of Panama by August, when only 500 pelicans were counted. Along with large nesting colonies on Taboga and Urabá islands, some 40 km away, the 5 nesting colonies in the Archipelago represent a major breeding concentration for Brown Pelicans, more individuals being counted than breed in the whole of the United States.

SEABIRD POPULATIONS ON NECKER AND NIHOA ISLANDS, NORTHWESTERN HAWAIIAN ISLANDS

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Necker seabird populations were censused during a five-day expedition in June 1982. Results of this survey will be reported and compared to 1980 and 1981 censuses of seabirds on Nihoa Island. To date there are breeding records for the same 17 species on both islands. Bonin Petrels are not known to breed on either island, though they breed elsewhere in Hawaii. The most striking differences between the two islands are found in the population sizes of the six procellariid species. While Necker has many times more breeding Black-footed and Laysan Albatrosses, far fewer Wedge-tailed Shearwaters, Bulwer's Petrels, Christmas Shearwaters and Sooty Storm-Petrels are found on Necker than on Nihoa. The June 1982 survey of Necker revealed only a single instance of attempted breeding by the latter two species. With the possible exception of the Masked Booby, Nihoa has the larger breeding populations of all the pelicaniform species. Lack of suitable methods as well as logistic problems that beset attempts to census the islands' five tern species make comparisons between these numbers difficult.

SEABIRDS OF MICRONESIA: STATUS OF CURRENT KNOWLEDGE

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The islands of Micronesia are among the most isolated in the world, and knowledge of the distribution, abundance, and nesting of the 18 species of resident and 25 species of migrant or vagrant seabirds is sketchy and scattered. Avifaunal information was summarized in 1951 by Rollin Baker in his comprehensive account, *The Avifauna of Micronesia*. Since then, limited research has been conducted in Micronesia. From 1957 to 1960, a naturalist collected eggs and recorded nesting information from Truk (J. Brandt); in the 1960's, the Pacific Ocean Biological Program, through the Smithsonian Institution, surveyed eastern portions of Micronesia; in the late 1970's, a Smithsonian Peace Corps Volunteer (J. Engbring) spent two years surveying birds in Palau; in 1979 a U.S. Fish and Wildlife Service (USFWS) employee (R. Clapp) visited seabird colonies of the Northern Marianas; and in recent years the Guam Aquatic and Wildlife Resources Division has

completed a number of studies on Guam. Several ornithologists have passed through Micronesia in recent years, but few have been able to reach the generally inaccessible islands where most seabirds nest. Little information has come from Yap, Ponape, or Kosrae since World War II. In 1981 and 1982, the USFWS, with local government assistance, conducted surveys in the Marianas; the surveys will extend to other islands of Micronesia in the future. These studies concentrate on forest birds, but seabird data is collected as well. With the phasing out of the U.S. Trust Territory in Micronesia and the establishment of new island governments, there has been a drive to complete roads and other development projects. This, along with a growing population, is placing increased pressure on natural resources. The USFWS is now in the unique position of being able to offer technical assistance and advice, which, it is hoped, will be incorporated in development plans and in conservation legislation of the newly forming governments.

SOME ASPECTS OF NEST SITE SELECTION BY SOOTY TERNS AT MIDWAY ISLANDS

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The purpose of this study was to investigate hypothesized differences in adult behavior and body condition, chick growth performance, and reproductive success of Sooty Terns nesting under two very different thermal regimes at Midway Islands. On Midway, Sooty Terns have recently begun to nest beneath ironwood trees (*Casuarina* spp.). Maximum Ta at 1200 hrs may differ by 10°C (39°C vs 29°C) in the normal open habitat and the ironwood habitat. During the hottest part of the day incubating adults were observed shading eggs 95% of the time in the normal habitat, but never shaded eggs in the ironwood habitat. Chick growth performance was enhanced in the ironwood habitat relative to the normal habitat. Data indicate a possible selective advantage for Sooty Terns nesting in the ironwood habitat in terms of increased reproductive success and decreased adult reproductive and chick developmental energy expenditure.

METABOLIC RATE DURING FLIGHT AND INCUBATION IN THE SOOTY TERN (*Sterna fuscata*)

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The CO_2 production of free-ranging Sooty Terns was measured during incubation and flight using doubly-labeled water (HTO-18). The cost of flight was determined to be 3 times basal metabolic rate (BMR) and metabolic rate during incubation was 1.59 times BMR. These results were compared with estimates for cost of flight of Sooty Terns made using aerodynamic theory. Observations of birds at sea indicate that flapping flight is predominant at ambient wind velocities of 0 to 10 knots. The effect of carried food loads on cost of flight was calculated. Sooty Tern flight costs are similar to other birds with high aspect ratios and low wing-loading (swallows and swifts). Published equations are poor predictors of the cost of flight in these birds because some of the coefficients were derived using data from birds with quite different aerodynamic characteristics.

BREEDING BIOLOGY OF THE CHRISTMAS SHEARWATER (*Puffinus nativitatis*) ON LAYSAN ISLAND, HAWAII

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From 1979-1981, data were collected on the breeding biology of the Christmas Shearwater on Laysan Island in the northwestern Hawaiian Islands. Approximately 1500-2000 pairs breed here

annually. Adults return to the island in February after a 4-month absence at sea. Most eggs are laid in April and May and are incubated for 52-54 days. The single white egg is laid in a nest under vegetation, in natural rock cavities, and occasionally in abandoned Wedge-tailed Shearwater and Bonin Petrel burrows. Most chicks hatch in June and are brooded approximately one week. The first chicks fledge in September when 98-115 days old. The major causes of egg and chick mortality are egg predation by Laysan Finches and interspecific competition with Red-tailed Tropicbirds and Brown Noddies for nest sites.

DISTRIBUTION AND FORAGING HABITS OF DARK-RUMPED PETREL (*Pterodroma phaeopygia*) IN THE EASTERN TROPICAL PACIFIC

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Sightings of over 1200 Dark-rumped Petrels in the eastern tropical Pacific indicate that they are widespread from 18°N to at least 12°S, with the Galapagos population appearing to be thinly continuous with the Hawaiian stock. At-sea Dark-rumped Petrels are typically solitary (72% of all individuals) but readily join in multispecies flocks (19%). Two types of foraging were recorded: 1) feeding on carrion (usually squid) was of minor importance, whereas 2) feeding on prey driven to the surface by large predatory fish (tunas) and possibly porpoise was of major importance. Dark-rumped Petrels were observed in association with at least 6 species of cetacea on 19 occasions, involving 59 petrels (5% of all individuals). Three species of porpoise (*Stenella longirostris*, *S. attenuata*, and *Delphinus* sp.) were the only species that consistently carried large bird flocks (including Dark-rumped Petrels), but the role of porpoise in bird/tuna/porpoise feeding assemblages in the eastern tropical Pacific remain unclear. Feeding on squids during the daytime is documented for this species, and implications for diurnal vs. nocturnal feeding are discussed.

MOLTING IN THE COASTAL WATERS OF BRITISH COLUMBIA

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Preliminary surveys and museum records indicate that several species of water birds molt along the coast of British Columbia. White-winged Scoter (*Melanitta fusca*), Surf Scoter (*M. perspicillata*), and Harlequin Duck (*Histrionicus histrionicus*) are the most abundant in summer. Smaller numbers of Black Scoter (*M. nigra*), Oldsquaw (*Clangula hyemalis*), and Greater Scaup (*Aythya marila*) are also found at that time. The large proportion of adult males in those flocks indicates that some are birds returned from the breeding grounds. Although the molting ducks occupied the most heavily used wintering areas, their distribution was more restricted.

Western Grebe (*Aechmophorus occidentalis*), Arctic Loon (*Gavia arctica*), Common Loon (*G. immer*), and Ruddy Duck (*Oxyura jamaicensis*) molt their primaries in the area but not until fall or winter.

AN ATTEMPT TO MONITOR STORM-PETREL POPULATIONS IN SOUTHEAST ALASKA

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Precise estimates of storm-petrel population parameters are difficult because these birds are burrow nesters, nocturnal, and patchily distributed within habitats. Permanent line transects have been used for sampling colonies. Some of the problems with this technique are long-term

disturbance of plots, difficulty in placement of transects, clumped distribution of nests, and difficulty in statistical testing of results. We attempted to overcome some of these problems by developing a sampling scheme of random plots. In 1982 we gathered population data on storm-petrels at St. Lazaria and Petrel islands in southeast Alaska. On St. Lazaria Island, 130 2-m^2 plots in four habitat strata were sampled, counting all burrows and determining burrow contents. On Petrel Island, 80 2-m^2 plots in three strata were sampled. We then calculated burrow occupancy, species ratios, and population size. Stratification resulted in a small increase in precision of the estimates, so that data could be analyzed as a simple random sample. Sample sizes on both islands were large enough so that a population change of 10% or greater could be statistically detected in subsequent years. Some of the problems with random samples are large sample sizes and observer biases.

COMPARISON OF AIR AND SURFACE COUNTS OF WINTERING WATER BIRDS IN A SOUTHEAST ALASKA BAY

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Repetitive bird counts were conducted from skiffs and a plane on three separate days at Port Frederick, 30 miles west of Juneau, in January 1981. The air crew saw 36% of dabbling ducks, 52% of diving ducks, 46% of geese, 119% of gulls, 72% of loons, 7% of grebes, 3% of alcids and 25% of cormorants seen by boat crews. For all birds the air crew tallied 50%. The possibility of assessing entire populations on the northeast Pacific coast using corrected air counts of sample plots is discussed.

ARTIFICIAL STIMULATION OF COLONY FORMATION IN LEACH'S STORM-PETREL (*Oceanodroma leucorhoa*)

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Leach's Storm-Petrel can be induced to colonize artificial burrows provided with taped courtship vocalizations. Artificial colonization was induced in Maine from 1979-1982 on an island inhabited by breeding Leach's Storm-Petrel, an island with a forty-year absence of breeding petrels, and an island with no record of breeding petrels. On all islands artificial burrows were dug with dimensions and inter-nest distances equivalent to those of wild birds. Tape recordings of one or both courtship vocalizations were played at burrow areas nightly during the breeding season. Colonization of the artificial burrows was non-random. Colonizers preferred the island inhabited by breeding petrels and the former nesting island to the island with no record of breeding petrels. Burrows provided with sound recordings of the two courtship calls attracted more colonizers than burrows with only a single courtship call. Finally, birds colonized burrows that were closer to the speakers than would be expected from a random pattern of colonization. In addition to the management implications of this work, similar experiments could identify the proximate factors controlling colony formation in other colonial birds.

COASTAL WATER-BIRD COLONY DISTRIBUTION BY LAND OWNERSHIP CATEGORY

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To determine the feasibility of a national water-bird monitoring program, colony data were used to assess the relative use by birds of lands in various ownership categories. Data from atlases from the following regions were used: Atlantic coast, western Gulf coast, California, and the U. S. Great Lakes.

In the North Atlantic, most water birds use sites that are not legally protected by federal or state statute. This pattern is even more apparent in the southeast and Gulf Coast states where, in most states, fewer than 25% of the water birds nest on federally-owned lands, state wildlife properties, or those owned or leased by conservation groups (Audubon, Nature Conservancy). In California, the vast majority of water birds nest on federally-owned rocky islands. On the Great Lakes coast also, the majority of birds nest on sites controlled by federal or state agencies. In New Jersey, Maine, Massachusetts, and Florida, the use by birds of "conservation" lands is much greater than expected on the basis of its availability in the coastal zone, suggesting potential habitat limitation.

FERAL ANIMALS—THE PROBLEM AND SOME MANAGEMENT CONSIDERATIONS

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This paper considers the problems caused by man's introduction of new animal species into existing natural communities. These introductions have occurred throughout history whenever humans have visited or colonized new territories. Domestic and commensal animals can adversely influence the ecosystems into which they are introduced, but feral populations that develop are especially damaging as they exist largely without cropping and management by humans. Feral populations often compete with domestic animals and native communities. Often wildlife refuges, national parks, seabird nesting sanctuaries, and other areas set aside to preserve natural areas and processes are particularly susceptible to disruption by introduced species. Numbers of ferals can be reduced by shooting, trapping, or poisoning, but these methods sometimes pose hazards to other values in an area. The reduction of animals by these means can also be unacceptable due to differences in human opinions about the values concerned. Eradication of local populations sometimes is impossible or impractical. Management to reduce numbers in critical areas or during critical seasons often is more feasible than eradication. As in all management endeavors, specialized knowledge and capabilities are necessary. Fortunately, several groups throughout the world are addressing this need and are increasing their ability to manage feral animal populations.

EFFECTS OF FOX FARMING ON ALASKAN ISLANDS AND THE PROPOSED USE OF RED FOXES AS BIOLOGICAL CONTROL AGENTS FOR INTRODUCED ARCTIC FOXES

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Foxes were first brought to Alaskan islands around 1836: fur farming peaked in the 1920's with introductions principally of arctic foxes. Red foxes were released on 27 islands but remain on only 12, whereas arctic foxes were translocated to at least 174 islands and survive on about 70. Introduced foxes have markedly altered diversity, abundance, and productivity of nesting birds. Besides nearly exterminating the Aleutian Canada Goose, seabird colonies on numerous islands were decimated. Nocturnal burrowing alcids and procellariids, such as Cassin's Auklets, Ancient Murrelets, and Leach's Storm-Petrels, suffered the greatest losses. These species also apparently are

the last to recolonize islands after the disappearance of foxes. Since 1949 poisoning has been carried out in the Aleutians, but foxes have been eradicated from only three islands. Evidence for the competitive exclusion of arctic foxes by red foxes is strong. The two species are not sympatric on ice-free islands. On several islands arctic foxes have been extirpated inadvertently by later introductions of red fox. Fox farmers considered the two species incompatible and commonly removed red foxes before stocking islands with more highly valued arctic foxes. North American canids appear intolerant of canid species smaller than themselves. Experimental introductions of sterile red foxes are planned.

ARCTIC FOX PREDATION ON NESTING COMMON EIDERS AT ICY CAPE, ALASKA

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Arctic fox preyed on Common Eiders nesting on a barrier island at Icy Cape, Alaska. Small clutches and late nesting possibly resulted from predation early in the season. Later, a single fox destroyed the entire nesting colony, cached an estimated 500 eggs, and killed one female eider. Glaucous Gull nests were also destroyed by foxes, but Arctic Tern nests survived. Man-made causeways connecting the mainland to a barrier island could provide foxes easier summer access to barrier island systems, and thus threaten eider colonies along the Chukchi and Beaufort Sea coasts. Abstract of paper to be published in Canadian Field Naturalist, in press.

FERAL CAT ERADICATION ON JARVIS ISLAND

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Feral cats have been established on Jarvis Island of the Southern Line Islands since 1938. Their predation on seabirds has reduced the avifauna to four breeding species.

From 14 June to 11 July, 1982, eradication techniques were assessed. Thirty-one cats were live-trapped and infected with feline enteritis, marked, and then released. Seven cats were fitted with radio transmitters to collect home range and movement data. One telemetered cat died of the virus. No further evidence of viral mortality was observed. Trapping and baiting trials indicate a marked preference for familiar food: fish and Sooty Terns. Canned cat food and catnip scent held no attractive power. Lethal Conibear and leg-hold traps were successful at lair entrances. Night hunting with shotguns followed the enteritis experiment. In 109 man-hours, 103 cats were shot. Black cats (58%) and tabby cats (32%) comprise the main phenotypes. Females (52%) exceeded males (47%). Mean weight was 2.65 kg. (n=43). Cats appeared healthy with adequate fat stores. Reproduction was quiescent and may be linked to Sooty Tern nesting.

RECOLONIZATION OF BAKER ISLAND BY SEABIRDS

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Baker Island National Wildlife Refuge is located near the equator approximately 3,000 km southwest of Honolulu, Hawaii. The island has an area of about 145 hectares and is approximately 6 m high. The U. S. Air Force operated a fighter and bomber base with up to 5,000 men on the island from 1942 to 1944. This extensive human activity, with the introduction of cats, resulted in the elimination of the once abundant seabird colonies. By 1963 there were only a few Brown Noddies nesting on a small island in the lagoon. In 1964 the cats were removed by personnel of the Pacific Ocean Biological Survey Program.

I visited Baker Island in November 1977 and 1978. The largest populations were found in 1978 when at least 10,000 Sooty Terns, 1,050 Brown Noddies, 600 Masked Boobies, 8,600 Lesser Frigatebirds, and lesser numbers of several other species were present. This dramatic recolonization was possibly initiated by birds from nearby Howland Island on which seabirds had survived, although populations there had also been diminished by feral cats. Howland Island is also covered by a heavy growth of *Digitaria* which appears to have limited the available nesting habitat.

INDIRECT EFFECTS OF HUMAN ACTIVITIES ON SEABIRDS IN THE HAWAIIAN ARCHIPELAGO

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The Hawaiian Archipelago is an important breeding ground for more than 14 million seabirds of 22 species. This area encompasses a large portion of the breeding range of nine species or subspecies. Populations of seabirds in the northwestern Hawaiian Islands have rebounded from the severe depredations of the early twentieth century which included guano mining, feather hunting, and the introduction of rabbits which destroyed native vegetation and nesting habitat on important colonies. Despite the general recovery of seabird populations during the past 50-60 years, there is renewed concern about the welfare of colonies due to the proposed increase in commercial fishery activities in the area. Indirect threats from fishing activities include the introduction of predators, herbivores, insects, birds, and vegetation; incidental take from on-island activities; and a general exposure to the man-made threats of the twentieth century. Each of these potential threats is described and its potential effect on the seabird resource discussed.

EFFECTS OF COMMERCIAL FISHING ON SEABIRDS IN THE HAWAIIAN ARCHIPELAGO

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The food habits of 18 species of seabirds which breed in the Hawaiian Archipelago were studied to determine which commercial fisheries may compete with seabird populations for food. Although several proposed fisheries should have little direct effects on seabirds, fisheries for juvenile goatfishes and juvenile *Decapterus* spp. (to supply bait for tuna fisheries), adult *Decapterus* spp., and ommastrephid squid should be carefully monitored and regulated since these species are a substantial component of the seabird diets. In addition, fisheries for shipjack and yellowfin tunas may affect several bird species which rely on tunas to drive prey to the surface, thus making it available. Although several species of Hawaiian seabirds are apparently limited by nesting sites rather than food, uncontrolled fishing could reduce prey resources to a level where food does become limiting.

HEAVY METALS AND ORGANOCHLORINES IN HAWAIIAN SEABIRD EGGS

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In 1980, we collected eggs of Wedge-tailed Shearwaters (*Puffinus pacificus*), Red-footed Boobies (*Sula sula*), and Sooty Terns (*Sterna fuscata*) from Oahu, French Frigate Shoals, Laysan, and Midway. Mercury was found in all eggs we analyzed, sometimes at moderately high levels. The highest mean concentration (0.36 ppm, wet weight) was in booby eggs from Midway, the westernmost study site. In this species there was a distinct trend toward higher concentrations from

east to west. There were no apparent differences among sites for the other two species, except for somewhat higher mercury concentrations in shearwater eggs from Oahu. Selenium also occurred in all eggs; mean concentrations in shearwaters and terns at each location were slightly above 1 ppm (1.09-1.38 ppm), and in boobies they were slightly lower (0.76-0.92 ppm). Cadmium was not found above the limit of detection (0.1 ppm). DDE was found at low levels in all eggs of all species, and other organochlorines occurred in some. Shearwater eggs contained the highest concentrations of DDE (up to 1.5 ppm) and the broadest array of organochlorines. In general, the seabird samples further document the widespread occurrence of mercury and organochlorines in the marine environment.

LIGHT ATTRACTION IN HAWAIIAN PROCELLARIIFORM BIRDS: AMELIORATION BY SHIELDING

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Autumnal attraction to man-made lighting is a major source of mortality in fledglings of 3 procellariiform species on Kauai, especially the Newell's Shearwater (*Puffinus puffinus newelli*). A controlled experiment in which the lights of the largest resort on Kauai were shielded from upward radiation and then left unshielded on alternate nights during 2 "fallout" seasons resulted in a 40% decrease in fallout with hoods in place. Most light attraction occurred between 1-4 hours after sunset. Fallout decreased during full moon for unknown reasons. A better understanding of this phenomenon may have theoretical and management significance.

HUMAN DISTURBANCE ON PROTECTION ISLAND

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Protection Island, Jefferson County, Washington, is the summer home of more than 70% of seabirds breeding in Puget Sound. This 350-acre island is the breeding ground of about 12,000 Glaucous-winged Gulls, 35,000 Rhinoceros Auklets, 800 cormorants, 600 Pigeon Guillemots, 30 Tufted Puffins, 30 oystercatchers, and 1 pair of Bald Eagles. Recently this island was designated the Protection Island National Wildlife Refuge by a bill of the U.S. Congress. This paper shows that though Protection Island has been and is the home of a significant wildlife resource, recent past and current levels of human use and disturbance have not been detrimental to seabird numbers as previously reported.

INGESTION OF PLASTIC BY MARINE BIRDS: A GLOBAL PHENOMENON

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To date, plastic particles have been found in the stomachs of 44 species of seabirds around the world. Twenty-one of these species are procellariiform birds. Ingestion of plastic has been recorded from the Arctic to the Antarctic, in both Atlantic and Pacific oceans. Large interspecific, geographic, age-related, and temporal variations in the quantity of plastics ingested have been recorded. Species feeding primarily by surface-seizing and pursuit-diving consume the most plastic. Crustacean- and cephalopod-feeders eat much more plastic than do fish-feeders. No obvious effects of plastic ingestion on the physical well-being of the birds have been found, but Red Phalaropes and Parakeet Auklets show evidence of some physical impairment.

VULNERABILITY OF SEABIRDS TO OIL IN THE TROPICS: MODIFYING A NORTH PACIFIC INDEX

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The vulnerability to oil of seabirds of coastal Venezuela was analyzed to identify priority areas for protection. The technique used was a modification of one developed by Manuwal, Wahl, and Speich (1979) for marine bird species of Washington State. The analysis indicated that tropical seabird vulnerability to oil is considerably lower than that of the seabirds of Puget Sound. Two reasons for the difference are that i) tropical seabirds tend to spend much less time on the water; mostly, they forage from the air and roost in trees or on cliffs; and ii) warmer sea surface temperatures reduce the probability that oiled birds will die of exposure.

SEABIRD-OIL SPILL BEHAVIOR STUDY

Varoujean, Daniel H. Nero and Associates, Inc., 520 SW Sixth Ave., Portland, OR 97204

As part of a study funded by the U.S. Bureau of Land Management, seabird interactions with floating oil were examined in an area of naturally-occurring oil seeps off Coal Oil Point, Santa Barbara Channel, California. The purpose of the study was to provide new information about the vulnerability of seabirds to oiling. During baiting experiments juvenile Brown Pelicans, Western Gulls, and Heermann's Gulls made contact with oil seepage slicks more than did adults. Furthermore, during these experiments Heermann's Gulls, classified as nonresidents of the Santa Barbara Channel (and presumably less frequently exposed to oil slicks) made contact with oil more than did Western Gulls. These results indicate that seabirds previously exposed to oil are more apt to avoid oil in the future.

Observations of seabirds resting or feeding in the vicinity of oil slicks documented that 15-25% of the loons, grebes, shearwaters, ducks, phalaropes, jaegers, and terns observed made contact with oil, whereas 40% of the Brown Pelicans, cormorants, Western Gulls, and Heermann's Gulls observed made contact with oil. That 40% of the cormorants made contact with oil supports the contention that diving species are more vulnerable to oiling. The high frequency of oil contact by pelicans and gulls indicates that non-diving seabirds may also be vulnerable to oiling.

INSULTS TO ALCIDS: INJURIES CAUSED BY FOOD, BY BURROWING, AND BY OIL CONTAMINATION

Fry, D. Michael, and Linda J. Lowenstine, Departments of Avian Science and Veterinary Pathology, University of California, Davis, CA 95616

Cassin's Auklets and Common Murres were examined histologically as part of a study on effects of oiling or were obtained oiled from International Bird Rescue, Berkeley, CA. Ten burrow-nesting Cassin's Auklets were examined, and all showed accumulations of crystalline particulates and inflammation of the lungs indicative of dust inhalation. Seven murres were studied, and none had lung accumulations of particulates, the expected result for cliff-nesting birds. The digestive systems of the auklets contained many traumatic lesions of the esophagus, crop, proventriculus, and gizzard, accompanied by focal bacterial infiltration and tissue reaction. The lesions indicate long-standing, repeated irritation by sharp prey items or parasites. Common Murres exhibited similar lesions of the digestive system and additional parasitic lesions.

Auklets exhibited dissociation of liver cells, and both species showed necrosis of kidney tubules in oil-contaminated birds. Hematocrits were variably depressed in oiled birds, with packed

cell volumes as low as 15-21% (normal values 50-65%). No differences were observed in the adrenal glands of oiled and control birds, nor were any differences observed in salt glands. This work was supported by BLM Contract #AA851-CT1-60.

SPECIES AND INDIVIDUAL STRATEGIES IN TWO *Diomedea* ALBATROSSES AT SOUTH GEORGIA

Prince, Peter A. British Antarctic Survey, Natural Environment Research Council, Madingley Road, Cambridge CB3 OET, England

Dietary, demographic, and bioenergetic difference are all factors in the difference in breeding frequency between the annually breeding Black-browed Albatross *Diomedea melanophrys* and the biennially breeding Grey-headed Albatross *D. chrysostoma*.

Within these species-specific patterns there is considerable individual variation, and present work investigating relationships between feeding performance at sea, partitioning of duties between the sexes, and breeding success and periodicity is described. Activity recorders measure the time spent by each parent in flight and on the sea during day and night; artificial nests, incorporating automatic weighing devices, record the size and timing of delivery of meals and the resulting changes of chick weights. Preliminary results demonstrate the importance of nocturnal activity on the water and permit the determination of foraging ranges and locations.

THE ENDANGERED ALEUTIAN CANADA GOOSE—ON THE THRESHOLD OF RECOVERY

Amaral, Michael. U. S. Fish and Wildlife Service, Endangered Species Division, 1011 East Tudor Road, Anchorage, AK 99503

Arctic foxes were first introduced to the Aleutian Islands in 1836 by the Russian-American Company, a fur farming enterprise, and today exotic fox populations thrive on many of the islands in the chain. Fox depredations on indigenous ground-nesting birds unused to terrestrial mammalian predators must have been catastrophic. There is little doubt that the introduction of arctic foxes to the Aleutian Islands was the primary cause for the endangerment of the Aleutian Canada Goose. In an attempt to restore the Aleutian Canada Goose to its former status and range, eradication of foxes, captive propagation and release of geese, transplantation of wild geese to other islands, and protection of the flock in the wintering grounds have been carried out. As a result, the wild population has increased from about 790 birds in 1975 to over 2,700 birds in 1982. While Buldir Island remains the principal breeding ground of the population, for the first time since the subspecies was listed as endangered, numbers of Aleutian Canada Geese have been found on other Aleutian islands. More important, this summer a new (or perhaps relict) breeding population in the eastern Aleutians on Chagulak Island was discovered. As the number of Aleutian Canada Geese continues to increase, the carrying capacity of the breeding habitat on Buldir Island may be reached; perhaps the only obstacle to full recovery is the remaining fox populations which prevent successful recolonization.

FOOD AND WEIGHT VARIATION IN THE LITTLE PENGUIN

Cullen, J. M., and T. Montague. Dept. of Zoology, Monash University, Clayton 3168, Melbourne, Australia

A resident population of Little Penguins (*Eudyptula minor*) has been studied in southeastern Australia since 1968. Unlike most temperate-latitude seabirds, they have a protracted breeding season (first clutches can be laid over a 4-month period and, after successfully raising one clutch,

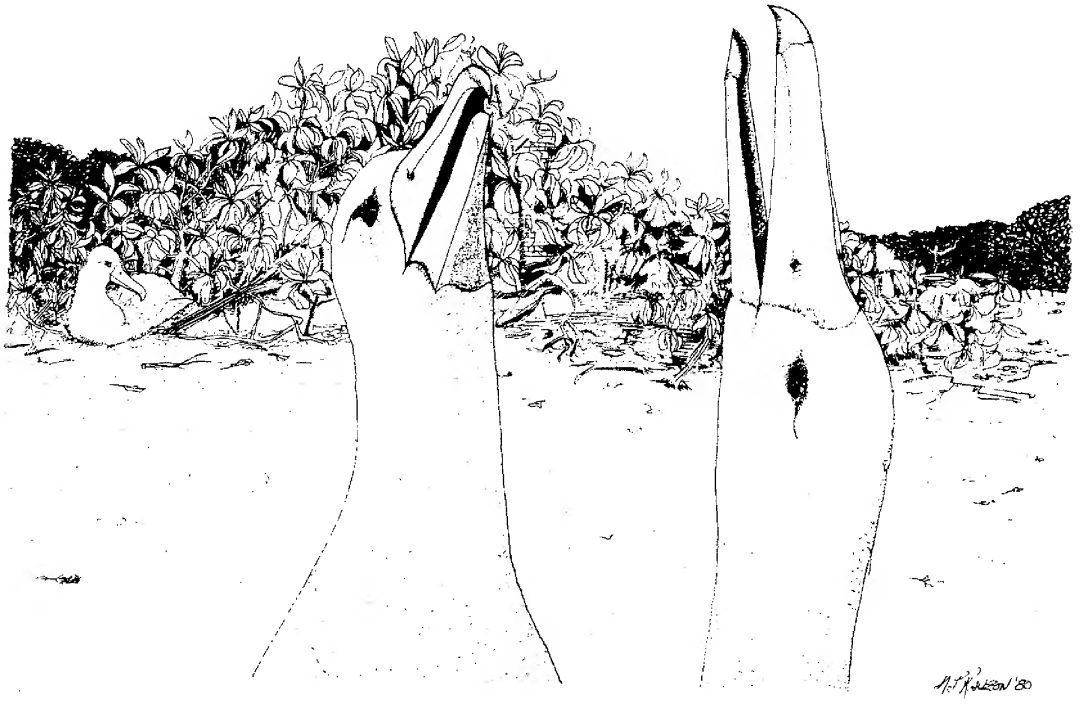
a pair may re-lay and occasionally raise a second. There are also year-to-year differences in the timing of the breeding season and in breeding success.

Since 1979 we have been studying the diet of the birds through the use of emetics. There are considerable changes from month to month in species composition of food items and in the amount brought ashore—presumably reflecting availability. During the breeding season the amount of food brought ashore varies and affects chick fledging weight, an important measure of breeding success. There are marked week-to-week changes throughout the year in the weight of food brought ashore and in the weights of the adult penguins. As these do not seem to correspond to gross sea conditions, we are puzzled to account for them but suspect that they may be crucial for the breeding system of this species.

ASSORTATIVE MATING IN COMMON TERNS, *Sterna hirundo*, ON GREAT GULL ISLAND, NEW YORK

Coulter, Malcolm C. Charles Darwin Research Station, Casilla 58-39, Guayaquil, Ecuador

Male and female Common Terns appear almost identical, differing externally only in bill size. Furthermore, they mate assortatively according to this character, and males always have larger bills than their mates. Because bill size is highly heritable, the mating system has genetic implications. For various reasons I suggest that pairs are formed with males having larger bills and that assortative mating is a statistical outcome of this.



SCIENTIFIC TRANSLATIONS COMMITTEE

The PSG and van Tyne Library have compiled a comprehensive listing of the translations currently held and available for the cost of copying and postage to members of the PSG and Wilson Ornithological Society. Citations of seabirds and waterfowl articles will appear in the next Bulletin. When ordering, please identify yourself as a member of PSG.

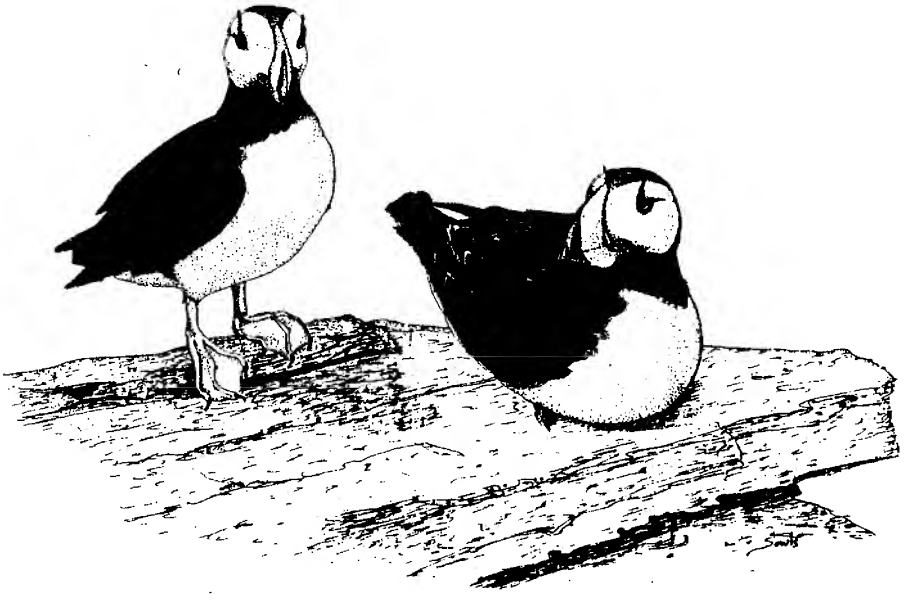
The attempt to establish a similar arrangement with the National Translations Center (John Crerar Library) has been abandoned because of their high fees.

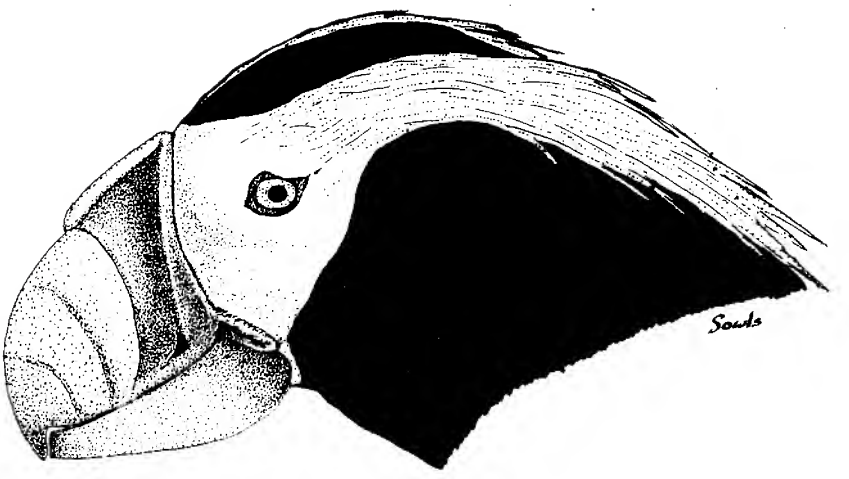
Members should notify me of articles and monographs on seabirds which have not been translated or reviewed in the Bulletin. It might be possible to find funds to have them translated; if not, at least abstracts for them can be prepared.

Judith Hand has established contacts with Soviet seabird biologists which will be used to keep us informed of Soviet seabird research.

There has been little response from members on the appropriateness of the work of the Scientific Translations Committee. I would appreciate hearing from members on new services and coverage which would be useful to them.

Douglas Siegel-Causey





WASHINGTON REPORT

During 1982 legislation, laws and regulations specifically mentioning seabirds were few and far between.

One bill that passed in the waning days of the 97th Congress and was signed into Public Law 97-389 by President Reagan on 29 December 1982 stood out. Title II of this Act, Marine Mammal Protection, contains two important seabird sections. The purpose of Title II is to amend the North Pacific Fisheries Act of 1954 to give guidance to the Secretary of Commerce on implementing a U.S.-Japan agreement on fisheries.

The first key provision directs the Secretary of Commerce to place authorized observers onboard Japanese salmon fishing and research vessels within the Fisheries Conservation zone. These observers are not only to study the biology of Dall's porpoise but also the incidental taking of "seabirds."

The second provision states that any Memorandum of Understanding (MOU) between the United States and Japan shall include adequately funded "seabird research." The MOU between the U.S. and Japan dated June 1981 is due to be modified or renegotiated by June 1984, and this provision should be included at that time.

Another important action by the 97th Congress was the establishment of Puget Sound's Protection Island, important for nesting seabirds, as a national wildlife refuge (PL 97-333).

Those concerned with East Coast seabirds, particularly waders, can breathe a sigh of relief. The 97th Congress enacted a barrier island protection bill. This act (PL 97-348) will preserve valuable habitat along 700 km of coast in 15 Atlantic and Gulf Coast states by restricting federal expenditures for roads, bridges, sewers, etc.

Daphne Gemmill

INTERNATIONAL COUNCIL FOR BIRD PRESERVATION
August 1982
Cambridge, England

The ICBP held a seabird workshop, 3-5 August 1982, attended by 51 biologists representing all continents. I congratulate ICBP for conceiving of this important event and for providing travel support to many participants. The workshop was followed by one-day symposia on seabirds and island management.

A major focus of the workshop was the regional status reports which defined problems and pointed to areas of ignorance. After two days of regional reports, the meeting broke into working groups according to 8 taxonomic divisions and 7 general "threats." The working groups prepared written recommendations to the ICBP based on information reported in the workshop. These recommendations are an important product of this meeting.

The lasting contribution of this meeting will be the publication of a series of 35 regional review papers and 7 "threat" papers. The titles are similar to those listed in the Summer 1982 PSG Bulletin. John Croxall, Ralph Schreiber, and Peter Evans are the editors.

I hope that ICBP will use its resources and influence to encourage seabird research and conservation. The titles of the regional papers illustrate the extent of our ignorance. There is no paper on Indonesia (10,000 islands), the Philippines (7,000 islands), or China. The paper on the South Pacific is fragmentary because no data are available for many areas. It is ironic that the 30th study on the Black-legged Kittiwake in Alaska can find a sponsor, but the first attempt at mapping colonies in Fiji or Indonesia cannot.

An offshoot of the workshop was the formation of an 18-member ICBP International Seabird Committee. The committee is to advise ICBP, advise other international bodies, and act as liaison between international bodies and the 5 regional seabird groups (e.g., PSG). A spirited and divisive meeting on the acceptance of bylaws and officers for this committee required two long evenings. Many commented that the chairman of the preceding International Seabird Committee, George Watson, had done little during the past four years and that new blood was needed. George Watson was nevertheless elected Chairman and Warren King Secretary. Four months after the formation of this committee, PSG has received no communication from the Chairman, nor has any committee member. The idea of an International Seabird Committee is a good one, but without energetic leadership membership does little more than enhance the resumes of a few individuals. If the committee does not begin work soon, perhaps a quorum can assemble somewhere to replace the present Chairman. I nominate A. W. Diamond.

Craig S. Harrison, Chairman PSG
January 1983

[In a telephone conversation George Watson states that the committee formed in Cambridge was not a continuation of the ICBP working committee and that the new committee was established partly because of criticism of the old ICBP committee and of the International Ornithological Congress Standing Committee for the Coordination of Seabird Research. George points out that he was not chairman of either of the old committees. In addition, in November 1982 he sent a letter from South America to Harry Ohlendorf requesting response from PSG and the designation of a PSG member to the ICBP committee. Harry never received the letter. Consequently, it is being redrafted and sent to Craig Harrison.-Ed.]

BOOK REVIEWS

The Thick-billed Murres of Prince Leopold Island. 1981. A. J. Gaston and D. N. Nettleship. 350 pp. Canadian Wildlife Service Monograph Series No. 6. Ottawa. Available as Cat. No. CW65-7/6E from Printing and Publishing Supply and Services Canada, Ottawa, ON K1A 0S9, Canada. $32.00 in Canada, $37.50 in other countries.

This report of a three-year study of the Thick-billed Murres of Prince Leopold Island sets a standard for future colony studies. The core of the book consists of five chapters covering attendance and behavior at the colony; timing and success of reproduction; development of young; adult weight, food, and feeding areas; and conclusions and general considerations. Each chapter begins with a discussion of the significance of the phase of the study covered and the methods used. The limits of the methodology used and the potential value of the results are thoroughly explored. The results are presented in detail (127 figures, 87 tables, and 28 appendices). Each chapter ends with a summary of results and conclusions. The final chapter discusses the role of the Thick-billed Murre in seabird communities, causes and consequences of coloniality, factors controlling population size, fledging strategy, and colony structure. Both theoretical and practical ramifications of the results are considered.

The study is impressive for its thoroughness and the amount of data collected without having marked birds. The original plan to gather data on year-to-year variation, however, was severely hampered when the study was cut from five years to three. The study was planned to gather information useful for planning for the exploitation of petroleum resources, and the authors clearly show that all aspects of the biology of seabirds are highly integrated and that the total biology of a species must be understood if sound management programs are to be developed. For example, Gaston and Nettleship show the dramatic diurnal and seasonal changes in colony attendance, presumably due to changes in prey distribution and abundance. Any monitoring program which does not allow for these changes is worthless. The problem is even more acute when annual, colony location, and specific differences are considered. It is now all too clear that short-term broad regional surveys of seabirds give little insight into the dynamics of seabird populations and have no value for detecting the effects of human activity on them. Although the cost of setting up a series of permanent monitoring stations at selected colonies would be expensive compared to the usual amounts spent on seabird research, it would be a pittance compared to the government royalties and industrial profits from petroleum production. Everyone concerned with the future of seabirds should demand that governments accept their responsibilities and spend the money.

I was disappointed that the authors didn't present more detailed discussions of many of their results. In comparison with the presentation of results, some of the conclusions seemed too brief. I hope that future papers will rectify this. For example, I was unconvinced by the evidence presented that the Thick-billed Murre might be particularly vulnerable to environmental changes because it is concentrated in a few large colonies and may no longer be flexible enough to respond to changing conditions. I wish the authors had elaborated on the reasons why they expect "variation between different parts of the colony equivalent to that occurring between local subpopulations of terrestrial birds many kilometres apart" (page 269).

Annoying to me was the use of the term "quality" as a characteristic of individual birds. Although they do not define what they mean by the term, the authors use it to describe birds which are more successful reproductively. However, it is now known that short-term observations on the reproductive success of individuals of long-lived species can be misleading. It is likely that a "quality" individual might have several years of poor reproductive success but still outperform

other individuals over its lifetime. There was no way such birds could be identified in this study. I wonder what the authors had in mind early in the book when they described the Thick-billed Murre as a "highly specialized species"; their characterization of it as "generalized" on pages 250-251 didn't seem to agree. Of course, all species are generalized in some ways and specialized in others, but the terms become useful only when their context is made clear, which was not always done here.

The book itself is handsome, with photographs used for the front and back covers. The 19 colored plates in the front display better than words the wonder of arctic bird colonies. The only unsatisfactory plates are those showing the variation in egg colors and markings. They appear to be composites of pictures of eggs photographed under different lighting conditions; it is hard to tell how much of the variation is due to lighting alone.

Two aspects of the book's production are unsatisfactory. The hardbound book is covered in paper instead of cloth; my copy already shows a few scars. I recommend that owners spray on a plastic protective film. Even this, however, will not prevent heavily used copies from needing rebinding prematurely. The text is set with a wide margin on the left side and a narrow one on the right side regardless of which side the page faces. This leaves no room for retrimming the pages when rebinding and ensures that some of the text will be almost inacessible if the book is rebound using side sewing, as is the usual library practice.

This is one of the most important books on seabirds ever published. The inclusion of much of the data collected during the study in the 28 appendices will be of lasting value for comparison with future studies of the Thick-billed Murre.—J. G. S., Jr.

Marine Birds and Mammals of Puget Sound. 1982. Tony Angell and Kenneth C. Balcomb III. 145 pp. Washington Sea Grant Puget Sound Books. Seattle. Available from University of Washington Press, Seattle, WA 98105. $14.50.

This is a handsome, well-produced book designed to provide the general public with information about Puget Sound marine birds and mammals. Introductory sections cover the wildlife heritage, habitats and communities, and forces that affect marine birds and mammals in Puget Sound. About a page of introductory material prefaces the discussion of each family. The short species accounts include a Puget Sound range map and sections on status and distribution and food and critical habitat.

The text (birds by Angell and mammals by Balcomb) is informal and conveys the authors' respect and affection for Puget Sound and its fauna. Angell's writing is often unclear. He makes numerous oblique references to ideas and information which he does not identify well enough for the uninitiated reader to understand. Balcomb's writing is clear and well organized.

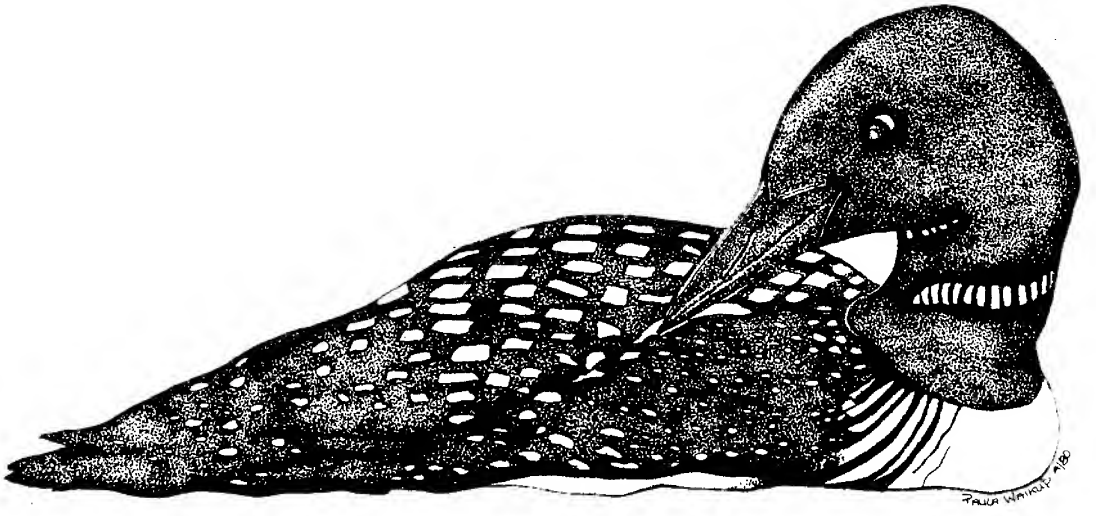
In the bird sections I found several misstatements of fact or interpretation. Loons have a hard time taking off because of their high wing loading, not because their legs are set far back. The air sacs in the breast of Brown Pelicans, not their skeletons, absorb the shock of the impact with the water. Not all terns have forked tails. I wonder how the author knows that any larid "enjoys" settling down on a protected beach. The evidence is still too scant to claim that Marbled Murrelets prefer nesting in hollow trees. These lapses are annoying since they mar an otherwise good job.

The range maps show small dots whose significance is not explained. (Maps in the appendix have dots of different sizes whose significance is also not explained!) Though dots may be adequate to represent sightings of rare species, they are misleading when used to indicate the range of species said to be found throughout the region. The dots seem to indicate that most species are absent from the Canadian waters of Puget Sound. The term "critical habitat" is not defined, and most of the habitat descriptions are too general to indicate any habitat as critical.

The most attractive aspect of the book is the abundance of Angell's black-and-white drawings. Many will want the book for them alone. Angell's success with individual drawings, however, is varied. They range from those with the expansive feeling of the drawings of Frances Lee Jaques, such as the picture of Golden Plovers over the Strait of Juan de Fuca, to cartoons, as in the drawings of Tufted Puffins. Angell is not satisfied with the typical bird poses; most of his drawings depict actions, which greatly increases the interest in a picture. He tends to give birds a reptilian aspect, and many pictures show hunched-up birds reminiscent of those of Audubon. Sometimes these approaches are effective; sometimes they fall flat. His drawings of shorebirds are the least successful. The bills on many species are wrong, especially those of the calidridines, which are almost all too pointed. The bodies of his Sanderlings are too short and plump. These criticisms aside, most of the illustrations are good and some are masterpieces.

Production is of high quality, and I noted only one typo; "euphausiids" is misspelled on page 92. Somehow the phalaropes were demoted to a subfamily in the heading on page 76 (to follow the new A.O.U. Checklist) but not in the text. The Sanderlings shown on page 65 are not in breeding plumage as indicated in the figure caption. "Storm-petrel" should be hyphenated.

Almost anyone interested in birds will enjoy this book. The information conveyed in it will be palatable to the general reader, but the main attraction will be the illustrations.—J. G. S., Jr.



NEW PUBLICATIONS

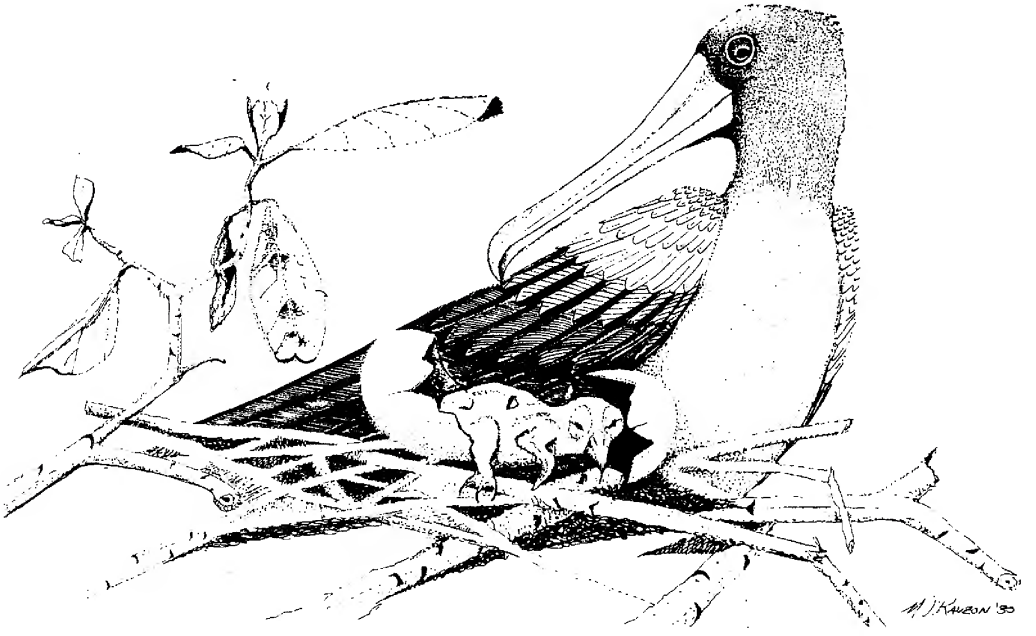
South Africa Seabird Bibliography

A bibliography of seabirds in the waters of southern Africa, the Prince Edward and Tristan groups. 1981. J. Cooper and R. K. Brooke. South African National Scientific Programmes Report No. 48.

This is an unannotated bibliography of 2088 references published through 1979. The index lists one species of Podicipediformes, six extant and three fossil species of Sphenisciformes, 49 species of Procellariiformes, 20 species of Pelecaniformes, 41 species of Charadriiformes, and references on guano. All references to seabirds in the area have been included. References to species which spend part of their life cycles in inland habitats are limited to works which deal with marine habitats.

A supplementary bibliography for the period 1980 to 1984 is planned. Copies are available upon request from:

Council for Scientific and Industrial Research
P.O. Box 395
Pretoria 0001, South Africa.



BULLETIN BOARD

Puffin Poster

Duff Wehle reports that no one had enough nerve to try to identify the marine birds hidden in the puffin poster. Those who would like to know their identities may find out by buying a poster from Duff.

Request for Manuscripts for Seabird

The United Kingdom Seabird Group proposes to produce a journal called Seabird which will contain original papers on seabird research. Although the emphasis will be on the North Atlantic and North Sea, papers from other regions of the world will be welcomed.

The journal will be published annually and will replace Seabird Report. Manuscripts should follow the recommendations for contributors to the Ibis. Two copies should be sent to one of the editors:

Dr. P. G. H. Evans
c/o Edward Grey Institute
Zoology Department
South Parks Road
Oxford OX1 3PS
United Kingdom

Dr. T. R. Birkhead
Zoology Department
University of Sheffield
Sheffield S10 2TN
United Kingdom

The deadline for inclusion in the 1983 issue was 1 January.

Requests for Photographs

The Bird Observers Club, Victoria, Australia, is planning to prepare an audiovisual cassette on the problems of birds which breed on beaches. They would be most grateful if members could supply slides (originals or copies) which illustrate species, colony areas, notices, habitats, or other items of interest or management value. Interested parties should correspond directly with:

Mrs. Ellen M. McCulloch, Hon. Sect.
Bird Observers Club
P.O. Box 185
Nunawading, Victoria 3131
Australia.

Seabird Jewelry

Auk lapel pin/tie tacs, black and white enamel, are available for $3.50 each from Betty Anne Schreiber, 4610 Maytime Lane, Culver City, CA 90230.

Protection Island in Washington State to Become National Wildlife Refuge

Protection Island, in the Straits of Juan de Fuca, Washington, became the latest addition to the national refuge system when President Reagan signed the "Protection Island National Wildlife Refuge Act" (Public Law 97-333, 96 Stat. 1623), on October 15, 1982. The Act authorizes the

Secretary of the Interior to acquire the island by donation, purchase, or exchange of lands and waters or interest therein within the approved boundaries of the refuge.

Protection Island has an area of 400 acres and provides nesting sites for 17,000 pairs of Rhinoceros Auklets, the fourth largest breeding colony of the species. The island is also an extremely important nesting site for several other species of seabirds. Approximately 70% of the seabirds in Washington State's inland waters use the island for nesting. It also provides refuge for other species, including harbor seals and the threatened Bald Eagle.

The U.S. Fish and Wildlife Service proposes to purchase private holdings on the island. P.L. 97-333 authorizes the expenditure of up to $4 million to acquire lands on Protection Island, and the recently signed Department of Interior appropriation includes $2 million which will be used this year to purchase property on the island.

The U.S. Fish and Wildlife Service will inform each landowner of the status of issues relating to the refuge.

Correspondence regarding Protection Island National Wildlife Refuge should be directed to:

U.S. Fish and Wildlife Service
500 N.E. Multnomah St., Suite 1692
Portland, Oregon 97232
Attention: Acquisition

Or contact either Garey E. Coatney at (503) 231-2154 about real estate matters or Willard B. Hesselbart at (206) 753-9467 concerning biological planning and management.

Colonial Waterbird Group News

The Colonial Waterbird Group held its sixth annual meeting in Chevy Chase, Maryland, 4-7 November 1982. Brian Chapman, Roger Evans, and Ralph Morris were elected to three-year terms on the Executive Council. Hans Blokpoel was elected by the officers and council to represent the CWG on the International Seabird Committee formed at the ICBP Seabird Workshop in August 1982, Cambridge, England. Herbert W. Kale II was reappointed as Editor of Colonial Waterbirds and William Davis was appointed as Editor of the CWG Newsletter effective upon the resignation of former Newsletter Editor Brian Chapman in March 1983.

Fourteen papers were presented at the Symposium Session on the Feeding Ecology of Waterbirds and twenty-five papers were presented in general sessions. Stephen Kress organized a round table discussion on Tern Status and Conservation in the Northeast and Great Lakes. The Student Award went to John Chardine, Brock University, Ontario, for his paper on behavioural correlates of pair-status in the Kittiwakes.

The seventh annual meeting is tentatively scheduled for early November 1983, to be held in Puerto Rico. Sean Furniss will head the Local Committee, and Vice President R. Michael Erwin will be in charge of the program. For further information about the Colonial Waterbird Group, contact Francine G. Buckley, Secretary, 372 South Street, Carlisle, Mass. 01741.

Request for Information on Buller's Shearwater

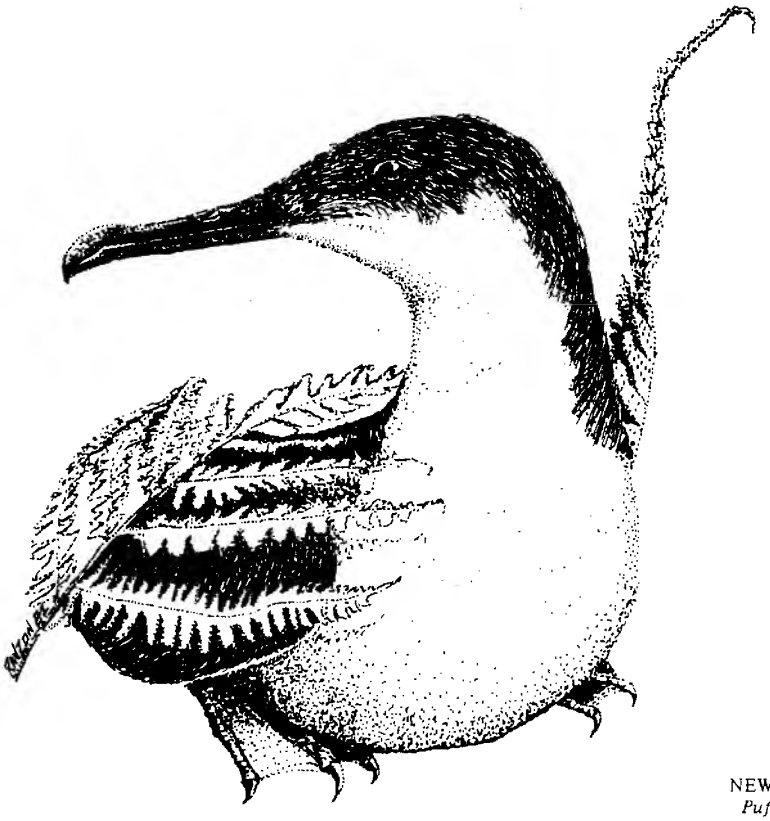
Information on the distribution of Buller's Shearwater in the North Pacific and along the west coast of South America is needed by a group working on the sea distribution of the species. Anyone interested in the species, or who knows of published records for the North Pacific should contact John Jenkins, 14 Lochiel Rd., Remuera, Aukland, New Zealand.

Second Iberoamerican Ornithological Congress

The Second Iberoamerican Ornithological Congress will be held in Xalapa, Veracruz, Mexico, in early December 1983. Those interested in further information should contact Dr. Mario A. Ramos, Presidente, Comite Ejecutivo Internacional, II Congreso Iberoamerican de Ornitologos, Apartado Postal 388, Xalapa, Veracruz, Mexico.

International Shorebird Survey

The International Shorebird Survey is a cooperative project seeking help from competent observers to gather counts of shorebirds in North, Central, and South America. Data will be used for research and conservation purposes. For more information, write ISS, Manomet Bird Observatory, Manomet, MA 02345.



NEWELL'S SHEARWATER
Puffinus puffinus newelli

The 'a'o nests high in the mountain fern forests of Kauai and flies far out to sea at dusk to feed on squid and fish rising to the surface.

Mark Rauzon © 1982

NEW MEMBERS

Robert E. Beck
35 Casa de Sevenidad
Yona, Guam 96910

Biologist
Studies: Ecology of Guam forest birds

Dana C. Bradley
310½ Peterson
Fort Collins, CO 80524

Student
Studies: Wildlife Biology
Interests: Art and the outdoors

Ronald G. Butler
Dept. Biological Sciences
Duquesne University
Pittsburgh, PA 15219

Associate Professor
Studies: Behavior of Great Black-backed Gulls

Hugh Drummond
Instituto de Biologia, UNAM
Apartado Postal 70-153
04510 Mexico, D.F.

Ethologist
Studies: Reproductive biology of Blue-footed Boobies
Interests: Behavior

Daphne Gemmill
215 10th Street, S.E.
Washington, DC 20003

Chief, Policy and Procedures Branch, Office of Federal Activities, U. S. Environmental Protection Agency
Studies: Shy Albatross in the Bass Straits and banding Lesser Snow Geese
Interests: Volunteer for bird studies, seabirds, especially albatrosses

Jon Christopher Peterson
San Diego Zoo
P.O. Box 551
San Diego, CA 92112

Public Relations Assistant
Studies: Grey whale migration
Interests: San Diego Double-crested Cormorant populations and teaching about Pacific birds

CHANGES OF ADDRESS

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Anchorage, AK 99508

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Addresses unknown

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ISLES, Cathy

HANSEN, Donald J.
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Corvallis, OR 97331

LLOYD, Denby
ADFG Habitat Division
333 Raspberry Rd.
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Anchorage, AK 99504

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2945 Ashby Ave.
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Ottawa, ON K1P 5K6, Canada
(613) 233-9250

WEINSTEIN, Evelyn H.
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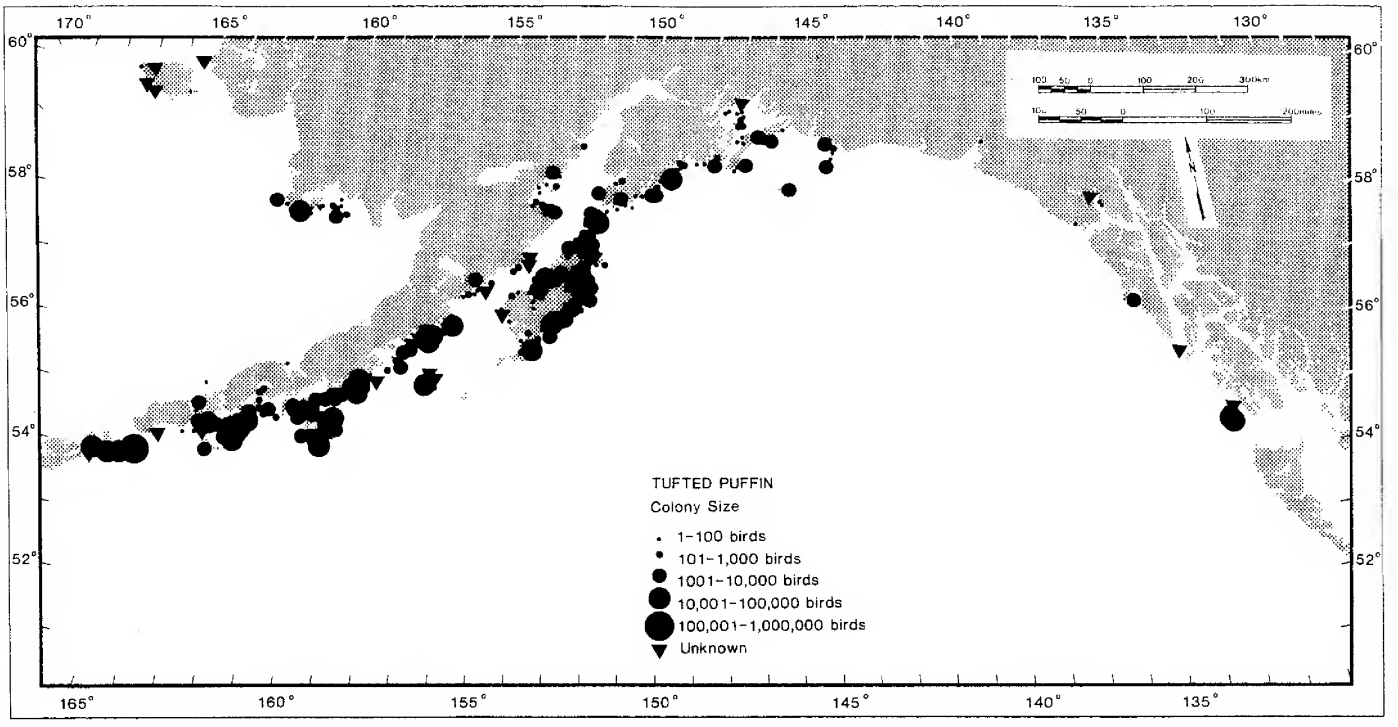
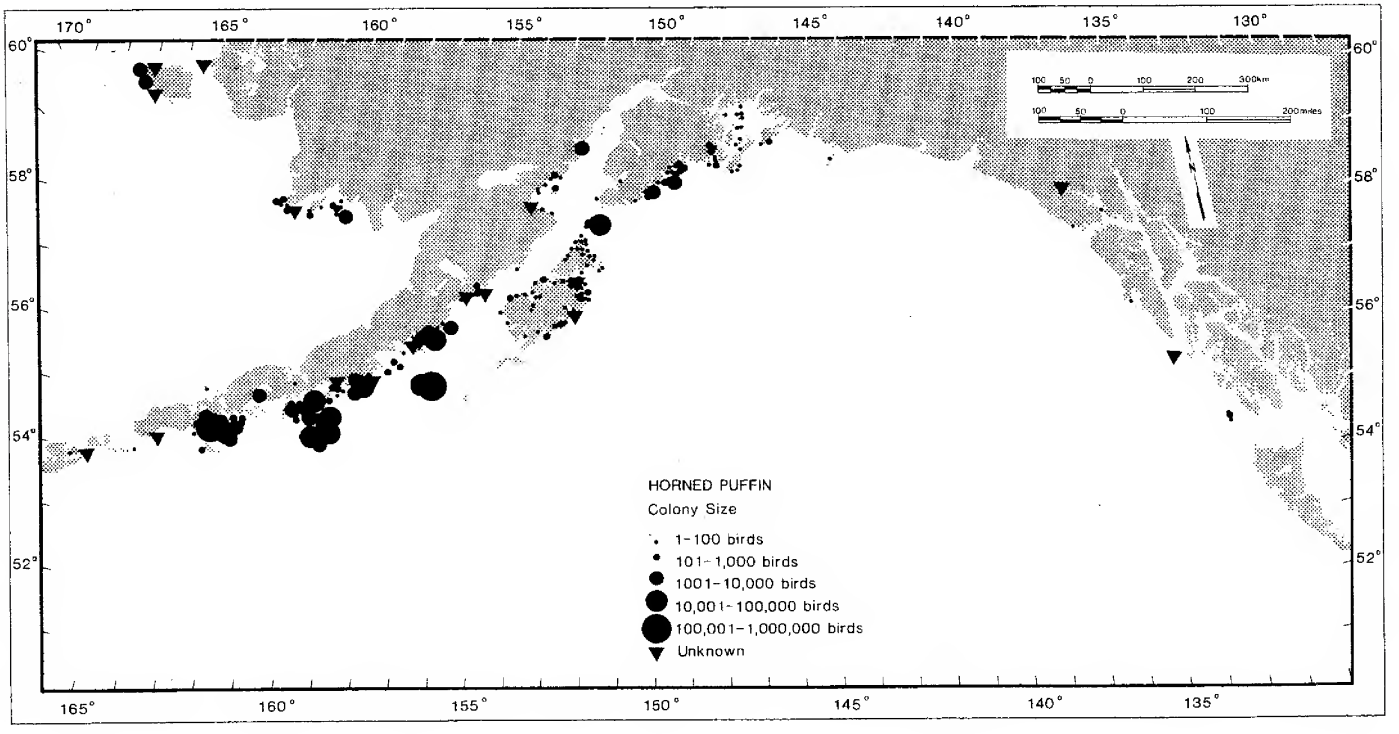
15 Sapsucker Woods Rd.
Ithaca, NY 14850


170°
165°
160°
155°
150°
145°
140°
135°
130°
60°
58°
56°
54°
52°
TUFTED PUFFIN
Colony Size
1-100 birds
101-1,000 birds
1001-10,000 birds
10,001-100,000 birds
100,001-1,000,000 birds
Unknown


170°
165°
160°
155°
150°
145°
140°
135°
130°
60°
58°
56°
54°
52°
HORNED PUFFIN
Colony Size
1-100 birds
101-1,000 birds
1001-10,000 birds
10,001-100,000 birds
100,001-1,000,000 birds
Unknown